York University Senate
Notice of Meeting

Thursday, March 26, 2015, 3:00 pm

Senate Chamber, N940 Ross Building

AGENDA

Page

Committee Reports

M. Armstrong, Secretary

Consent Agenda (ASCP Agenda)

The Senate of York University – Minutes

Meeting: Thursday, February 26, 2015, 3:00 pm
Senate Chamber, N940 Ross

R. Mykitiuk *Chair*
P. Amarasooriya
M. Amin
M. Anam
M. Annisette
S. Ariyarathnam
M. Armstrong *Secretary*
A. Belcastro
S. Benchimol
L. Ber
M. Bhiel
G. Brewer
H. Campbell
G. Comninel *Vice-Chair*
B. Crow
C. Davidson
R. De Costa
P. Delaney
S. Dimock
K. Dowler
S. Ehrlich
J. Etcheverry
J. Garrido
J. Goldberg
D. Golemi-Kotra
E. Gutterman
R. Haché
M. Hamadeh
M. Hamaoui
C. Heidari
B. Heron
C. Heron
D. Hunt
D. Ipperciel
R. Irving
V. Jain
D. Khayatt
A. Khazak
A. Kumarakrishna
S. Lawrence
R. Lee
U. Lehrer
R. Lenton
D. Leyton-Brown
B. Lightman
M. Lockshin
G. Malfatti
M. Martel
G. McFadden
S. McLaren
J.J. McMurtry
A. Medovarski
G. Mianda
K. Michasiw
M. Milo
G. Monette
T. Moore
J. Morrison
D. Mutimer
R. Myers
P. Ng
J. O'Hagan
R. Owston
L. Packer
S. Pagiatakis
A. Perry
M. Phuong
B. Pilkington
R. Pillai Riddell
A. Pitt
R. Robski
K. Rogers
M. Roy
L. Sanders
V. Saridakis
D. Scheffel-Dunand
E. Schraa
A. Schrauwers
L. Serigio
M. Shoukri
M. Singer
H. Skinner
B. Spotton Visano
N. Sturgeon
H. Tamim
G. Tourlakis
P. Tsasis
S. Tufts
A. Vianei
P. Walsh
J. Warren
R. Wellen
R. Wildes
L. Wright
H.Wu
J. Yeomans
R. Zeidenberg

1. Chair's Remarks

The Chair, Professor Roxanne Mykitiuk, expressed appreciation to Senators for their sympathy and support, and offered special thanks to the Vice-Chair, Professor George Comninel, for ably chairing in her absence. She confirmed that, in anticipation of a possible disruption of academic activities, the Executive Committee has taken the

preparatory steps outlined in the Senate Policy on the Academic Implications of Disruptions or Cessations of University Business Due to Labour Disputes or Other Causes.

2. Minutes of the Meeting of June 26, 2014

It was moved, seconded and *carried* "**that Senate approve the minutes of the meeting of January 22, 2015**."

3. Business Arising from the Minutes

There was no business arising from the minutes.

4. Inquiries and Communications

a. Senators on the Board of Governors

Professor Angelo Belcastro and Professor David Leyton-Brown, Senators on the Board of Governors, presented a synopsis of the Board's meeting of February 23, 2015.

b. Academic Colleague to the Council of Ontario Universities

The Academic Colleague to the Council of Ontario Universities, Professor George Tourlakis, presented COU's February Issues Update.

c. Vice-President Finance and Administration re: Safety Update

An update on safety initiatives and investments from the Vice-President Finance and Administration as distributed via the listserv prior to the meeting was noted.

5. President's Items

a. Recent Developments

In his remarks, President Mamdouh Shoukri hailed the Board's approval of a Policy on Sexual Assault Awareness, Prevention, and Response. Developed by stakeholders throughout the University, the Policy is a significant milestone that reinforces the University's commitments and recognized leadership in this domain. A well-attended and successful YU Research Leaders celebration held on February 25 showcased the University's top-flight research and honoured Professor Sergey Krylov, Faculty of Science, as the recipient of the President's Research Excellence Award and Professor Shayna Rosenbaum, Faculty of Health, who received the President's Emerging Research Leadership Award. Dr Shoukri also commented on the Council of Ontario University's Community Transformation Report and the development of the Institutional Strategic Directions Document (ISDD).

b. Planning for the Pan Am and Para Pan Am Games

At the request of the President, Vice-Provost Academic Alice Pitt updated Senate on preparations for the Pan Am and Parapan Am Games events on the Keele campus this summer.

Committee Reports

6. Executive Committee

a. Information Items

The Executive Committee advised that it had concurred with recent recommendations to add individuals to the pool of prospective honorary degree recipients made by its Sub-Committee on Honorary Degrees and Ceremonials with the result that four new candidates have been deemed eligible for honorary degrees. Senate Executive also reported that it had completed its annual review of Faculty Council membership lists for 2014-2015, and was scheduled to meet with members of the Board Executive Committee at an informal dinner gathering on March 3. A communication on safety and other matters from Senator Prakash Amarasooriya was appended to the report.

7. Awards

The Awards Committee reported on the distribution of undergraduate student awards for 2013-2014 and profiled recipients of the President's Research Awards.

8. Academic Standards, Curriculum and Pedagogy

a. Establishment of MASc and PhD Programs in Mechanical Engineering, Department of Mechanical Engineering, Lassonde School of Engineering / Faculty of Graduate Studies

It was moved, seconded and carried "the Committee on Academic Standards, Curriculum and Pedagogy recommends that Senate approve the establishment of MASc and PhD programs in Mechanical Engineering housed in the Department of Mechanical Engineering, Lassonde School of Engineering, effective Fall-Winter 2015-2016."

b. Establishment of an Honours BA and Honours Minor Program in Educational Studies, Faculty of Education

It was moved, seconded and carried "that Senate approve the establishment of an Honours BA and Honours Minor program in Educational Studies, Faculty of Education, effective Fall Winter 2015-2016."

c. Establishment of a Diploma in Advanced Accounting (Type 1), Schulich School of Business / Faculty of Graduate Studies

It was moved, seconded and carried "that Senate approve the establishment of a Diploma in Advanced Accounting (Type 1), housed in the Schulich School of Business, effective Summer 2015."

d. Establishment of a Diploma in Professional Accounting, School of Administrative Studies, Faculty of Graduate Studies

It was moved, seconded and carried "that Senate approve the establishment of a Diploma in Professional Accounting (Type 3), housed in the School of Administrative Studies, effective Summer 2016."

e. Establishment of a Bilingual BSc Program in Biology, Department of Multidisciplinary Studies, Glendon

It was moved, seconded and carried "Senate approve the establishment of a bilingual BSc program in Biology, housed in the Department of Multidisciplinary Studies at Glendon, effective Fall – Winter 2015-2016."

f. Changes to the Structure, Degree and Admission Requirements of the Master of Accounting Program, Schulich School of Business, Faculty of Graduate Studies

It was moved, seconded and carried "that Senate approve changes to the structure, degree and admission requirements of the Master of Accounting Program, Schulich School of Business, Faculty of Graduate Studies."

g. Establishment of 90-credit Degree and Honours Minor Options for the BA Program in Professional Writing, Writing Department, Faculty of Liberal Arts & Professional Studies

It was moved, seconded and carried "that Senate approve the establishment of 90-credit Degree and Honours Minor Options for the BA Program in Professional Writing, Writing Department, Faculty of Liberal Arts & Professional Studies ."

h. Establishment of a 90-credit Degree Option for the BA Program in Jewish Studies, Humanities Department, Faculty of Liberal Arts & Professional Studies

It was moved, seconded and carried "that Senate approve the establishment of a 90-credit degree option for the BA program in Jewish Studies, Department of Humanities, Faculty of Liberal Arts & Professional Studies, effective Fall Winter 2015."

i. Changes to Degree and Admission Requirements for the Masters of Financial Accountability Program, School of Administrative Studies, Faculty of Graduate Studies

It was moved, seconded and carried "that Senate approve changes to the degree and admission requirements for the Masters of Financial Accountability program, as set out in the proposal."

j. Establishment of an Honours Minor Option for the BA and BSc Programs in Global Health, Faculty of Health

It was moved, seconded and carried "that Senate approve the establishment of an Honours Minor Option for the BA and BSc programs in Global Health within the Faculty of Health, Fall Winter 2015-2016."

k. Changes to Requirements for the Master of Education Program, Graduate Studies

It was moved, seconded and carried "that Senate approve a reduction in the number of courses required for each of three program options in the Master of Education (MEd), as set out in the appendix."

l. Changes to the Admission Requirements Bachelor of Science in Nursing 2nd Degree Entry Program, School of Nursing, Faculty of Health

It was moved, seconded and carried "that Senate approve the following revisions to the admission requirements for the Bachelor of Science in Nursing 2nd Degree Entry Program, effective Fall Winter 2016-2017 entailing

- An increase to the minimum cumulative GPA for the last 60 credits from C+ to B
- An increase to the minimum GPA for the last 30 credits from B to B+
- A minimum grade of B in each of the prerequisite courses required for admission."

m. Changes to the Mature Student Admission Category

It was moved, seconded and carried "that Senate approve a reduction in the minimum age required for mature student status from 21 to 20 years of age by the end of the calendar year of admission to the University."

n. Consent Agenda Items

Senate approved by consent ASCP recommendations to

- change requirements for Certificates of Proficiency, Department of Languages, Literatures & Linguistics, Faculty of Liberal Arts & Professional Studies
- changes to the Requirements for the BA and BSc Programs in Computer Science, Department of Electrical Engineering and Computer Science, Lassonde School of Engineering

o. Information Items

Academic Standards, Curriculum and Pedagogy reported that it had approved minor degree requirement changes for the following:

Faculty of Liberal Arts & Professional Studies

Honours and Specialized Honours Bachelor of Public Administration Programs
BA Programs in Italian Studies
Honours and Specialized Honours BA Programs in Professional Writing
BA Programs in Business & Society
BA Programs in Health & Society
BA Programs in International Development Studies
BA Programs in Interdisciplinary Social Science
BA Programs in Law & Society
BA Programs in Urban Studies
BA Programs in Work & Labour Studies

School of Arts, Media, Performance and Design

BA and Specialized Honours BA and Honours Minor Programs in Music
BFA Program in Music
Honours BFA Program in Visual Arts
90-credit BA Program in Visual Arts

Faculty of Health

BScN Post-RN Program for Internationally Education Nurses
Specialized Honours Bachelor of Heath Studies, Health Management

Glendon

BA Programs in Canadian Studies

Lassonde School of Engineering

Honours Minor BA and BSc Programs in Computer Science
Specialized Honours BA and BSc Programs in Computer Security
BEng Program in Electrical Engineering

9. Academic Policy, Planning and Research

Academic Policy, Planning and Research provided Senate with an updated chronology of its engagement with Academic and Administrative Program Review (AAPR), confirmed that it had begun meetings with the Deans, Principal and University Librarian, and advised that amendments to the Senate – Board of Governors Policy on Endowed Chairs and Professorships would be forthcoming.

10. Academic Policy, Planning and Research / Academic Standards Curriculum and Pedagogy

In a joint report to Senate, APPRC and ASCP conveyed the most recent annual report on Non-Degree Studies prepared by the Vice-Provost Academic.

11. Other Business

There being no further business, Senate *adjourned*.

R. Mykitiuk, Chair _____

M. Armstrong, Secretary _____

EXECUTIVE COMMITTEE

Report to Senate
at its Meeting of March 26, 2015

FOR INFORMATION

1. Senate Executive and the Disruption of Academic Activities

A chronology of the Committee's meetings and key decisions prior to and during the academic disruption that began with a strike by CUPE 3903 on March 3 has been updated to reflect the Senate meeting of March 19 and the receipt of the course lists. See Appendix A.

Senate Executive will continue to monitor the disruption at scheduled weekly meetings and at other times as is required. Inquiries and communication should be forwarded to the Committee's Secretary, Maureen Armstrong (maureena@yorku.ca).

The Chair will have further remarks at the meeting.

2. Approval of Faculty Council Nominees for Membership on Senate Committees

The Committee approved the membership on Senate Executive of Professor Michael Longford, Associate Professor, Arts, Media, Performance and Design.

3. Gathering with Members of the Board of Governors Executive Committee

An informal gathering of members of the Senate and Board Executive committees scheduled for March 3 was postponed.

Roxanne Mykitiuk, Chair

Appendix A - Senate Executive and the Academic Disruption 2015

February 10	At its regular February meeting, the Committee reviewed Senate's Policy on the Academic Implications of Disruptions or Cessations of University Business Due to Labour Disputes or Other Causes and discussed the role it would play in the event of disruption
February 26	The Chair confirmed at the February meeting of Senate that the Executive Committee was preparing for the possibility of an academic disruption resulting from a strike by CUPE 3903.
February 27	With a strike appearing possible within days ("imminent" in the words of the Policy), the Committee held a special meeting after which it issued a "Statement on Academic Implications of Potential Disruption." This document was informed by Senate Policy, a chronology of actions taken by Senate Executive before, during and after the Disruption of 2008-2009, and the Provost's recommendations regarding academic activities in the event of a strike. The Executive Committee's February 27 communique noted that "at the outset of a disruption, if it were to occur…all academic activities, classes and examinations will be suspended at the University except for a minimal number with distinctive characteristics." The Committee also pledged to deal "quickly and sensitively with academic implications if they were to arise, and will communicate decisions that it makes widely and promptly."
March 3	On the first day of the strike by CUPE 3903, the Committee issued a formal declaration that there had been a significant disruption of academic activities. As a result, and based on decisions made at the February 27 meeting, all academic activities were suspended with the following exceptions: • non-degree courses not involving CUPE 3903 members • activities already scheduled off campus, such as off-campus courses, practicums, placements or internships not involving CUPE 3903 members • degree credit activities offered through the Osgoode Hall Law School at its downtown Toronto site • graduate degree credit activities at the Schulich School of Business, including the Schulich Executive Education program and Schulich-Kellogg courses
March 5	At a special meeting, the Committee began to actively monitor the disruption and to discharge its responsibilities in accordance with Senate Policy. The Chair confirmed that the Registrar had communicated with counterparts at other universities to advise them of the disruption and to seek their assistance in processing late applications from York students. The University Librarian had communicated with users about access to libraries. The Secretary reported that collegial governance activities were largely unaffected, with some reports of postponements for reasons other than the strike. The Secretary also provided the Committee with a day-by-day projection of responsibilities. Members had a preliminary discussion of the timing of a Senate meeting which, pursuant to the Disruptions Policy, must be called by the fourteenth day of a disruption. Because the strike was in an early stage, a decision was deferred. The Committee also reviewed current sessional dates given the possibility that some modifications would be required in the future. The Provost asked that the list of exempted activities include the Master of Human Resources Management which had been inadvertently omitted from the original

	request. The Committee approved this addition. Provost Lenton provided the Committee with an assessment of the impact of the disruption and described measures that had been enacted (including the extension of bursary assistance deadlines and guidance on the scheduling of recruitment events). The Registrar reported on class and examination schedule scenarios. The Committee endorsed a proposal to move the final date to withdraw without receiving a grade in Winter term undergraduate courses from March 6 to the final day of classes. It was noted that Faculties should adjust petition and appeal due dates to align with this change.
March 6	The Committee updated its March 5 bulletin by adding the Master of Human Resources Management to the list of activities that were exempt from the suspension, and defining a "suspension" of academic activities: • classes are not held -- on campus or online -- and are not moved to other locations • no course tests or examinations are scheduled with the exception of graduate defences (which may proceed at the request of the students) • no course assignments of any kind are due
March 9	The strike reached its seventh day, and the Committee issued a communication confirming that the disruption would exceed one week. The Disruptions Policy presumes that a disruption of this length will entail remediation for quarter and half courses, and the Committee confirmed that "some adjustments to class schedules will be necessary. There may also be modifications to normal academic regulations (it has already been announced that the last day to withdraw from courses without receiving a grade will be extended, with details to be announced)." Decisions will continue to be guided by the core principles of academic integrity and fairness to students. The communication was not distributed and posted until late in the evening until the results of voting by the three CUPE 3903 units were announced.
March 10 - present	Members of the Committee received correspondence from individual students and faculty members, and from groups of faculty members. These were acknowledged generally by the Chair in her remarks at Committee meetings. Correspondence from groups was distributed to the membership and filed.
March 10	At a special meeting, the Committee welcomed Professor Leslie Sanders (Chair of ASCP) and Professor Saridakis (Chair of Appeals) to the Committee as full voting members of Senate Executive for the duration of the disruption. The Committee continued to build on its repertoire of options and decision-making criteria by reviewing material from previous disruptions. The Provost submitted a memorandum on "Resumption of Classes" together with a confidential summary of current or pending resumption requests and projected start dates. Faculties and programs who were seeking a resumption in the near future stressed the overriding imperative of fairness to students. It was estimated that 56 courses taught by Unit 1 members with course director "tickets" would not resume The Provost reported that many students have asked that classes resume, and fairness argued in favour of allowing them a choice. Remediation plans have been completed or are at an advanced stage for all Faculties as the Deans and Principal work with colleagues on comprehensive arrangements. Out of the discussion emerged additional criteria by which to assess remediation plans.

	The Committee reviewed remediation plans and approved the resumption on March 11, 2015 all courses offered by: - the Lassonde School of Engineering - the Schulich School of Business - the School of Nursing - the School of Administrative Studies - the School of Human Resources Management The Committee's decisions were communicated immediately after the conclusion of the meeting.
March 12	At a special meeting the Committee received, in draft and confidential form, a document entitled "Institutional Guidelines for Faculty-Specific Remediation Frameworks." The draft guidelines were based on the principles of the Disruption Policy and included recommended changes to sessional dates, principles for remediation, and accommodations for students who are unable or unwilling to participate in academic activities because of the strike. Draft Faculty remediation plans, based on the resumption of all classes except those taught by CUPE 3903 Unit 1 course directors, were distributed for review by the Committee and some Deans in attendance spoke to their planning. It was agreed that members would review the material, relay questions to the Deans and Principal, and reconvene Monday morning. The Osgoode Hall Law School asked to resume courses in JD programs on Monday, March 16. The Committee approved the proposal on the understanding that CUPE 3903 work will not be replaced. This decision was relayed in a fifth bulletin issued by the Committee.
March 16 (Senate Executive meeting)	The Committee held a special meeting at which it reviewed Faculty-specific remediation frameworks and the Provost's Institutional Remediation Guidelines. In a bulletin that also declared that the disruption had reached its fourteenth day, the Committee issued its decisions, stating that classes in the following Faculties will resume on Tuesday, March 17: School of the Arts, Media, Performance and Design; Faculty of Education; Glendon Faculty of Health (classes not already resumed) and Faculty of Science. Classes for the following Faculties for which additional time to prepare for resumption would begin on Monday, March 23: Faculty of Environmental Studies Faculty of Liberal Arts and Professional Studies classes not already resumed In its communique, the Committee noted that some courses will not resume – notably those that are directed by CUPE 3903 Unit 1 members who remain on strike. Tutorials and labs associated with these and other courses may not be active. Some assignments may not be graded until after the disruption. The Executive Committee also reported that there would be reduction in the length of the Y and W terms of seven days. Additionally, the formal examination schedule will start later than originally planned.
March 16 (Senate)	The Committee, having called a Special Meeting of Senate on the fourteenth day of the Disruption, reported on its actions prior to and during the disruption. It also

	elaborated on the decisions made earlier in the day and responded, through the Chair and Vice-Chair, to matters raised by Senators.
March 17	At its regular March meeting, the Committee noted that the Chair planned to call a special meeting of Senate following receipt of a petition from the requisite number Senators. Although the petitioners had requested a meeting time of 10:00 a.m. on March 18, members agreed that that the meeting would be held at 3:00 p.m. on Thursday, March 19. A draft motion was also considered. To maximize participation it was agreed that voting on a motion should be conducted by paper ballot. The Committee also reflected on the Senate meeting of March 16 and agreed to a process whereby lists of courses that could be resumed with academic integrity in FES and LA&PS would be forwarded by Friday, March 19. The lists would not be subject to approval.
March 18	Members assisted in the preparation of a report to Senate which focused solely on matters related to the Disruption and its actions.
March 19 (Senate)	Senate Executive provided Senate with a record of its meetings and decisions prior to and during the disruption of academic activities that began on March 3. Aided by a presentation, the Chair drew special attention to • the core principles of Senate's Policy on the Academic Implications of Disruptions or Cessations of University Business Due to Labour Disputes or Other Causes – academic integrity, fairness to students, and timely information • principles articulated in an Institutional Remediation Guidelines document prepared by the Provost to which Faculty remediation frameworks align • Senate Executive decision-making criteria and the contextual factors that have informed the Committee's decisions as the disruption has evolved • a request from Senate Executive that the Faculty of Environment Studies and Liberal Arts and Professional Studies provide lists of courses that can proceed on March 23 with academic integrity (which are due by 4:00 pm on March 20, with a posting on the University Website of the courses shortly thereafter) • Senate Executive's ongoing monitoring role and commitments Senate debated a motion "that Senate call upon Senate Executive Committee to continue the suspension of all classes that have not yet resumed until the end of the labour disruption." The motion was defeated with 33 voting in favour and 84 opposed.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY

Report to Senate
at its meeting of 26 March 2015

FOR ACTION

I. NEW PROGRAMS

6.3 a) Establishment of MASc and PhD Programs in Civil Engineering • Department of Civil Engineering • Lassonde School of Engineering / Faculty of Graduate Studies

The Committee on *Academic Standards, Curriculum and Pedagogy* recommends that Senate **approve the establishment of MASc and PhD programs in Civil Engineering anchored in the Department of Civil Engineering, Lassonde School of Engineering, effective FW 2015-16.**

Rationale
The supporting documentation for this item is attached as Appendix A. The Bachelor (BEng) program in Civil Engineering was approved by Senate in October 2013 and, with approval by Quality Council thereafter, was launched this academic year. In keeping with Faculty and University academic plans, the introduction of Masters and doctoral programs in Civil Engineering will make the Department a strong competitor among Civil Engineering programs nationally, and contribute to the University goal of comprehensiveness and research intensification.

The learning outcomes for both the MASc and PhD programs have been clearly expressed and aligned with the respective degree requirements. A highly favourable assessment of the proposed programs was issued by the external reviewers (from the University of Ottawa and the University of Windsor). They commended in particular the unique modular organization of the graduate courses, suggesting that the structure ought to be a model for other engineering programs.

The statements of support from Dean Kozinski and Vice-President Lenton (included in the Appendix) confirm the resource plans for the new programs, including the staggered expansion of the faculty complement in the Department. The Senate Committee is pleased to recommend the approval of the two graduate programs in Civil Engineering.

Approved by: FGS Council 12 March 2015 • ASCP 18 March 2015 • APPR 19 March 2015

CONSENT AGENDA

6.3 b) Changes to Degree Requirements of the International Bachelor of Business Administration Program (iBBA) • Schulich School of Business

The Committee on *Academic Standards, Curriculum and Pedagogy* recommends that Senate **approve changes to the requirements and structure of the International Bachelor of**

Business Administration Program (iBBA) program in the Schulich School of Business as set out in Appendix B.

Rationale
The iBBA program provides students with the knowledge, skills and experience to perform successfully in an international business environment. The program focuses classroom and experiential learning opportunities on understanding and managing *unique differences* of a specific regional and local market and business environment. It promotes students' immersion in a cultural, social and economic context of a geographic region. In addition, the program is designed to ensure that graduates are cognizant of the role of business in society with particular attention paid to moral and ethical responsibilities expected in international business contexts.

The attached proposal sets out the collection of proposed degree changes and new program options for the International Business Administration Program (iBBA), and a full rationale for the restructuring. In sum, the changes are intended to enhance the program by:

- increasing curriculum flexibility; and
- providing students a distinct and rewarding iBBA experience, differentiated from the BBA program

The program has been experiencing a transfer of students from the iBBA to the BBA after year one. The revised curriculum will better accommodate students' range of interests so they do not have to transfer to the BBA if their programmatic interest changes. The re-designed structure of the program will provide students an enhanced self-designed and immersive learning experience that better achieves the objectives and distinctiveness of the program sought by students.

Approved by: Schulich Faculty Council 12 December 2014 • ASCP 11 March 2015

6.3 c) Changes to Degree Requirements of the BA and iBA Specialized Honours Programs in Economics • Economics Department • Glendon

The Committee on *Academic Standards, Curriculum and Pedagogy* recommends that Senate **approve a reduction in the number of major credits required for the Specialized Honours BA and iBA Programs in Economics from 66 to 60 credits, effective FW 2015-16.**

Rationale
In 2013 the Economics Department at Glendon reviewed and revised the course levels (e.g. 2000 and 3000 levels) of its core curriculum in order to harmonize with the Economics programs housed in the Faculty of Liberal Arts and Professional Studies, since many of the courses in the two units are cross-listed. As result of the course level changes, and to fully harmonize major credit requirements with the Specialized Honours BA program in Economics in LA&PS, the number of credits is being reduced from 66 to 60. Specifically the reduction in credits is in the Economics courses (from 48 to 42); the number of required mathematics credits remains at 18.

Approved by: Glendon Faculty Council 13 February 2014 • ASCP 25 February 2015

FOR INFORMATION

1. Minor Curriculum / Academic Standards Items Approved by ASCP

Minor modifications to degree requirements were made for the following:

Glendon
BA programs in Business Economics
BA programs in International Studies
BA and BSc programs in Psychology

Faculty of Science
90-credit BSc program in Physics and Astronomy, Physics Stream
Specialized Honours BSc program in Physics & Astronomy: in each of the Applied Physics; Astronomy; and Physics Streams

Schulich School of Business
BBA / iBBA program (degree requirements and an academic regulation)

Leslie Sanders, Chair
Academic Standards, Curriculum & Pedagogy

New Undergraduate and Graduate Degree Program
New Program Brief Template

The development of new undergraduate and graduate degree programs follows the protocol for new degree approvals as outlined in the York University Quality Assurance Process and also complies with the Quality Council's Quality Assurance Framework.

The Program Brief for new degree programs that require full approval includes two components for undergraduate programs and three components for graduate programs, as follows:

- program proposal, including letters of consultation/support and other relevant appendices
- curricula vitae of the faculty, including program-specific appointment criteria (for new graduate programs only)
- external reviewer nominations

To ensure that all of the evaluation criteria are addressed in the proposal under development, program proponents are required to submit the New Program Brief in the following format.

York University

New Program Brief
of the
Master of Applied Science (MASc)
and
Doctor of Philosophy (PhD) Degrees
in
Civil Engineering

Submitted: February 26, 2015
Revised: March 20, 2015

1. Introduction

1.1 Provide a brief statement of the degree program(s) being proposed, including commentary on the appropriateness and consistency of the degree designation(s) and program name with current usage in the discipline or area of study.

A graduate degree program in Civil Engineering is proposed in compliance with the Quality Assurance Framework of the Ontario Universities Council on Quality Assurance (OUCQA)[1], scheduled to begin in September 2015. The program encompasses two research-oriented degrees in the discipline at different targeted levels of training, i.e., a Masters of Applied Science (MASc) Degree and a Doctor of Philosophy (PhD) Degree in Civil Engineering. A two-tiered graduate program, such as the one proposed herein, follows national and international practices in engineering departments. Research-oriented degrees are intended for training of highly-qualified personnel (HQP) equipped with fundamental understanding in their areas of specialization so as to tackle emerging societal challenges that relate to the civil engineering discipline through active participation and leadership in the advancement of knowledge.

Modern Civil Engineering is organized in sub-disciplines that are shaped by the needs of society. New challenges are reflected as focal points of ongoing active research, whereas basic research is often an underlying motivation. These areas have already been identified in the establishment of the Lassonde's Department of Civil Engineering as: (a) Infrastructure Lifecycle Management, Maintenance and Rehabilitation; (b) Design for Climate-change-driven Extreme Events; and (c) Sustainable Development. (For brevity, these areas are referred to hereon as **Infrastructure**, **Resilience**, and **Sustainability**). Due to the increasing complexity of these challenges, developing a commensurate capacity for innovation requires researchers with a rounded academic profile that encompasses: (i) fundamental knowledge and deep understanding of the state of the art in their chosen areas of specialization; (ii) versatility and quick adaptation to new computational and/or experimental simulation technologies; and, (iii) auxiliary skills in research methodology and a spherical appreciation of the state of practice in their sub-discipline. To address these needs the proposed Civil Engineering graduate program seeks to offer a specialized research training experience at the graduate level particularly focused on innovative problem-solving, encouraging the pursuit of excellence through acquisition of depth in the candidate's field of specialty while at the same time exposing the student to the interdisciplinary nature of the emerging research thrusts in Civil Engineering, as highlighted above. Communication skills, entrepreneurship, and cognizance of professional and societal needs at a global level are highly valued attributes of the profile of the graduate engineer and are pursued systematically through the introduction of pertinent elements in the structure and method of program delivery.

Establishing a graduate program in Civil Engineering is an essential step towards the expansion of the department into a fully-developed academic entity with a well-defined imprint in the Canadian higher-education scene. This imprint will be defined to a large extent by the research agendas of the Department's faculty, and will be measured by their collective research contributions to the state of the art through the advancement of knowledge. The role of the graduate student researchers is critical in this endeavor as their contribution is essential in proof-testing innovative concepts and in transforming them to material findings through meticulous systematic work in their capacity as research assistants to the faculty members. As articulated in the York University's University Academic Plan (UAP) 2010-15[2], intensifying the research agenda and placing a renewed focus on academic quality are strategic priorities of York University. The establishment of the proposed graduate program in Civil Engineering represents a significant step in this direction. In line with Renaissance Engineer™ philosophy of the Lassonde School of Engineering, the proposed program will facilitate broader learning and scholarly achievements of graduate students by focusing on enhancing the students' communication skills, their awareness of legal, ethical, intellectual property (IP) and entrepreneurship issues, environmental stewardship and sustainability. In this light, it is also relevant to underscore the key role that will be played by graduate students in the capacity of teaching assistants (TAs) for the successful attainment of the educational objectives of the recently-established undergraduate Civil Engineering program. Clearly, the objectives of the proposed graduate program are consistent with these priorities. The proposal also

[1] OUCQA (2014). Quality Assurance Framework. Updated January 2014. Available at: http://www.oucqa.ca/wp-content/uploads/2014/01/Quality-Assurance-Framework-and-Guide-Updated-January-2014.pdf (accessed Oct 13, 2014)
[2] http://www.yorku.ca/secretariat/senate/committees/apprc/documents/UAP2010-2015.pdf (accessed Oct 13, 2014)

coincides in time with the Province of Ontario's stated commitment to expand the number of graduate student positions by 2016[3].

Program requirements will comprise a combination of advanced coursework and research work culminating in the completion and successful defense of a research thesis by the graduate student. These requirements will differ in intensity and scope depending on the tier of study. As in most Canadian civil engineering departments, the proposed graduate program will co-exist and share teaching and other resources with the Department's Master of Engineering (MEng) program, which is being proposed simultaneously in another graduate program brief. To enable compatibility and synergy and to make optimal use of faculty time in the two programs, course delivery will be structured in a modular format. This is consistent with recommendations by international think tanks for the future of engineering education, such as a report by the National Academy of Engineering (NAE) on the future of engineering education[4].

The Civil Engineering profession deals with all aspects of the built and natural environment. With the expansion of urban development involving projects of an unprecedented scale, the ensuing pressures on natural resources placed by an ever increasing urban population cause severe demands on infrastructure, water use and reclamation, energy consumption and transportation loads. These circumstances combined with the effects of the harsh environmental conditions on structures and soils, and the need to control the consequences of man-made activities (for example, Canada's oil sands) and natural hazards forge the continuous evolution of the scope of the profession in order to encompass the emerging challenges. A familiar example is the visible effect of heavy winters on ageing bridges and road pavements in Ontario, both of which cannot be easily demolished and replaced. Such ageing infrastructure warrants a significant investment on behalf of society, which in turn requires systematic life-cycle assessment and innovative approaches to rehabilitation to facilitate normal function of the urban environment. Civil Engineering graduates, upon completing a four-year bachelor's degree, possess all the essential skills needed to gain further insights into the specialization within Civil Engineering in which they are employed; however, because of the inherently complex, inter-connected and multi-faceted nature of any Civil Engineering project, their success and hence career advancement, will invariably require their acquiring additional skills and advanced technical knowledge in one of the several existing or emerging sub-disciplines of Civil Engineering. It is estimated that approximately one third to one half of Civil Engineering graduates seek some form of post-graduate training at some point in their professional career so as to obtain the specialized knowledge needed in order to respond to the complexity of modern civil engineering projects.

Recognizing the growing need for highly-skilled Civil Engineering professionals, the American Society of Civil Engineers (ASCE) commissioned an international think tank to establish the vision of the future Civil Engineers, which culminated in the publication of a report that outlined the vision for Civil Engineering in 2025[5]. This report defines a new role for Civil Engineers of tomorrow, reflecting a new level of leadership and professionalism. Civil engineers would be entrusted by society to achieve a sustainable world and raise the global quality of life. To earn that confidence, Civil Engineers, as a group of professionals, would master five key areas: planners, designers, constructors, and operators; stewards of the environment; innovators and integrators of technology; managers of risk; and, leaders in public policy. It is worth pointing out that this vision is entirely consistent with the Renaissance Engineer™ philosophy of the Lassonde School of Engineering and is interwoven in the proposed graduate program in Civil Engineering.

The ASCE report envisions that as the Civil Engineering profession moves towards the goals of Vision 2025, the profile of the Civil Engineer will change so as to assume a greater share in responsibility and leadership by integrating technology with resources. In the same context, the report by NAE[6] places emphasis on the introduction of research activities as a training experience in engineering education and the need for training of HQPs with Master's and doctoral degrees, thereby underscoring the strategic importance of investing in 'human' capital for a sustainable future of the state. It makes the following key recommendations:

- The bachelor's degree should be considered a pre-engineering or "engineer in training" degree.
- The master's degree should become the recognized engineering "professional" degree.

[3] http://www.tcu.gov.on.ca/pepg/publications/PolicyFramework_PostSec.pdf (accessed Oct 13, 2014)

[4] National Academy of Engineering (2005). Educating the Engineer of 2020: Adapting Engineering Education to the New Century. Available at: http://www.nap.edu/openbook.php?record_id=11338&page=1 (accessed Oct 13, 2014)

[5] ASCE (2009). Achieving the Vision for Civil Engineering in 2025: A Roadmap for the Profession. Available at: http://www.asce.org/uploadedFiles/Vision_2025_-_New/Vision2025RoadmapReport_ASCE_Aug2009.pdf (accessed Oct 13, 2014)

[6] National Academy of Engineering (2005). Ibid.

- Colleges and universities should endorse research in engineering education as a valued and rewarded activity for engineering faculty and should develop new standards for faculty qualifications.
- University education should produce engineers who can both define and solve problems.
- In addition to producing engineers who have been taught the advances in core knowledge and are capable of defining and solving problems in the short term, institutions must teach students how to be lifelong learners.
- Engineering educators should introduce interdisciplinary learning in the undergraduate curriculum and explore the use of case studies of engineering successes and failures as a learning tool. Institutions should encourage domestic students to obtain MS and/or PhD degrees.
- The engineering education establishment should participate in efforts to improve public understanding of engineering and the technology literacy of the public.

In light of all these emerging guidelines for the future demands of Civil Engineering education, this proposal is also very timely considering the Reaching Higher and Putting Students First plans through which the Government of Ontario has expressed its commitment to expansion of graduate student spaces by 6,000 through 2016[7]. The goals of the proposal are in line with the philosophy of this framework, aiming for excellence in delivering a cutting edge curriculum, and in promoting the development of a culture for research in the newly established Department of Civil Engineering. The actions encompassed by the graduate program will mobilize the department's resources at a higher level, consistent with the reasoning articulated in the recent founding of the Lassonde School of Engineering and York University's commitment for expansion of graduate level research.

1.2 For graduate programs that wish to have a Quality Council endorsed field(s), please indicate the field(s) for each of the master's and PhD programs.

Not Applicable.

1.3 Provide a brief description of the method used of the development and preparation of the New Program Brief, including faculty and student input and involvement.

Program development has been structured by establishing first the conceptual framework and goals consistent with the philosophy of the Lassonde School of Engineering (LSE), through extensive consultation with the faculty members of the department and the Lassonde faculty, the Dean and Vice-Dean of Academic Affairs, and the Faculty of Graduate Studies. As a point of reference in this endeavor, systematic reference has been made to specifications for Graduate Degree Level Expectations that have been issued by the Ontario Council of Academic Vice-Presidents. The conceptual framework has also benefited to a large extent by the vision and the recommendations contained in the NAE[8] and ASCE[9] reports. The implementation plan and detailed development ensued after consideration of the emerging international trends in Civil Engineering education through consultation with prominent professionals in the field, consideration of published guidelines of professional organizations regarding the profile and knowledge requirements of contemporary Civil Engineers (ASCE Body of Knowledge in Civil Engineering) and after review of competing graduate programs in Canada (University of Toronto, University of Waterloo, McMaster University, Queens' University), the US (SUNY Buffalo, MIT, Texas A&M, Purdue University, University of Michigan at Ann-Arbor, UC Berkeley), and Europe (Rose School at Pavia, Italy, ETH Zurich, EPFL Lausanne, Imperial College London).

Particular reference was made to MIT's recent report[10] on the future of engineering education, with regards the new directions in course development using modular format for delivery and blended learning methods. At this stage of the proposal development, all faculty members of the department participated in establishing the program of courses and course learning objectives, and in structuring the courses of the individual areas of specialization. In this effort, consultation was sought with faculty members from other affiliated faculties in order to establish potential collaborations with other Departments (Mechanical

[7] http://www.tcu.gov.on.ca/pepg/publications/PolicyFramework_PostSec.pdf. Ibid. (accessed Oct 13, 2014).
[8] National Academy of Engineering (2005). Ibid.
[9] ASCE (2009). Ibid.
[10] MIT (2014). Final Report of the Institute-wide Taskforce on the Future of MIT Education. Available at: http://web.mit.edu/future-report/TaskForceFinal_July28.pdf (accessed Oct 13, 2014).

Engineering, Earth and Space Science and Engineering, Electrical Engineering and Computer Science) and to identify possible relevant courses offered by other engineering departments which could be recommended in the graduate curriculum as electives. These consultation processes involved one-to-one meetings, department meetings and also teleconferencing with some of the recently-hired faculty members in Civil Engineering.

1.4 Indicate the Faculty/unit in which the program will be housed (for undergraduate programs) or anchored (for graduate programs).

The proposed program will be housed in the newly-established Department of Civil Engineering within the Lassonde School of Engineering, York University.

2. General Objectives of the Program

2.1 Provide a brief description of the general objectives of the program.

The envisioned graduate program in Civil Engineering will comprise research-oriented (MASc and PhD) as well as professional (MEng) graduate degrees that are deployed in parallel. The MEng program, which is described in detail in a separate New Program Brief, will draw on the resources of the MASc and PhD programs for its activities and the delivery of graduate courses. As such, this proposal paves the path towards development of a fully-fledged graduate program in Civil Engineering and its objectives are both Educational and Organizational at the Departmental level.

The Educational Objective is to provide excellence in learning and professional capacities of its students, contributing through graduate education to the development of innovation and to the exploration of novel and emerging areas of Civil Engineering. In the context of Renaissance Engineering, the program envisions students with a breadth of scope and capabilities for independent learning, enabled to creatively weave the body of knowledge in arriving at innovative solutions to engineering problems. The philosophy of the graduate program is to develop a learning experience that places emphasis into interdisciplinary practical problems that challenge modern Civil Engineers. These skills will be persistently targeted for by exposing the students to basic and applied research projects that involve expertise or insights from more than one sub-discipline of Civil Engineering. The program also aims to endow the students with a variety of skills beyond the scope of Civil Engineering, necessary for their future professional development by engaging them in complementary education over and above the core specialized technical training, through seminars from the fields of business, law, oral/written communication, ethical issues in engineering, and an introduction to the cutting-edge and emerging science and technology.

The Organizational Objective of the proposed program is to lay the operational foundation of the entire range of graduate programs in Civil Engineering through the development of the graduate-level course materials and affiliated repositories, to consolidate the essential procedures in support of the blended methods of delivery and to establish the mechanics of compulsory skill-development activities at the graduate level (for example, seminar series, research methodology, delivery of research related activity in the laboratories through graduate thesis work, presentations to expert audiences, independent studies, etc.). To enable the implementation of the educational objectives, the program aims to establish a modular approach to the structuring and delivery of courses, in a manner that will facilitate expansion of learning into interdisciplinary areas allowing independence and flexibility in forming the area of specialization according to the student's individual research interests and professional aspirations and objectives.

The proposed program targets the attainment of the following attributes in the profile of its graduating students:

- State-of-the-art competence and insight in their academic discipline; full awareness and capacity in the state of practice in the area of professional interest; versatility in simulation tools or necessary field testing procedures; knowledge of research methods and ability to conceive and articulate objectives and to document scientific hypotheses in addressing a novel engineering challenge.
- Ability to use effectively the body of knowledge and to plan, organize and carry out targeted research as required for synthesizing independent solutions to complex engineering problems in their chosen discipline; demonstrated ability to analyze and to articulate critical judgment from first principles.

- Cognizance of the complexity of knowledge, the complexity of engineering solutions, the interaction of different fields of science, the tradeoffs between various methods and approaches (breadth vs. depth) and the ethical role of the Civil Engineer as a steward of the environment and a proponent of progress in the quality of life and in economic development.

2.2 Describe how the general objectives of the program align with University and Faculty missions and academic plans.

The proposed graduate program in Civil Engineering was inspired by the mission of the Lassonde School of Engineering of developing a new paradigm in engineering education known as the Renaissance Engineer™. This objective is interpreted in the proposed program as a guiding priority to prepare the future graduate engineer for a leadership role in society and possessing - apart from academic qualities including a demonstrated ability to participate in supervised research - a number of critical skills, such as social conscience, entrepreneurship, and global engagement (see in Figure 2.2.1, a visual expression of the plan for providing a rounded education to the graduate engineer).

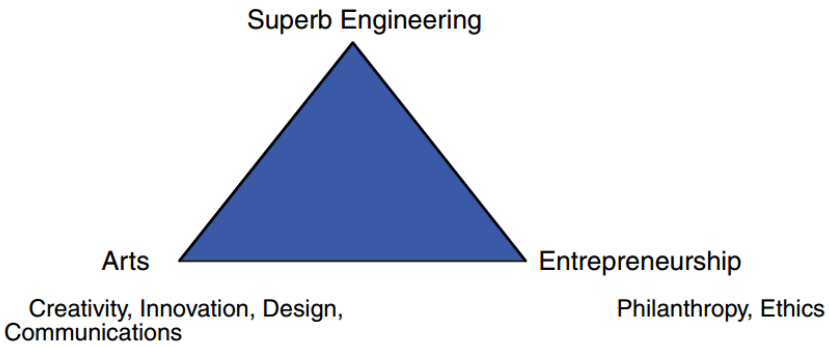


Figure 2.2.1: The Olin Triangle[11]

Emerging in the midst of the greater metropolitan area of Toronto, where several other competing graduate programs are already offered, the proposed graduate program in Civil Engineering seeks to establish its signature in graduate education of Civil Engineering by embracing the Renaissance Engineer™ philosophy of the Lassonde School of Engineering and building upon and strengthening the Department's three research themes of **Infrastructure**, **Resilience** and **Sustainability**. The research theme of **Infrastructure** focuses on above-ground infrastructure, such as roads, bridges, buildings, etc. and on buried infrastructure, such as water distribution networks, sewers, commuter tunnels, etc., with the overarching goal of understanding and developing business economics of infrastructure rehabilitation and replacement, including lifecycle assessment and costing. Technological breakthroughs in terms of assessing remaining serviceable life of a structure as well as retrofitting and rehabilitation of aging infrastructure will be sought. Scientific explorations into the effects of environmental and user-controlled factors on various construction materials (e.g. concrete, steel, wood, masonry, etc.) will also be undertaken. The research theme of **Resilience** focuses on the performance of civil infrastructure during extreme loading events, which, because of shifting climate patterns, are becoming more frequent and more severe. The overall goal is to develop novel materials and construction technologies that improve the resilience of civil infrastructure so as to ensure post-extreme-event functionality of such infrastructure. Given that world's human population is increasing at an unsustainable rate, the need for sustainable development is more critical than ever. The **Sustainability** research theme will focus on developing technologies for construction using recycled and renewable materials. Another key focus area will be construction over marginal-quality land such closed municipal landfills and degrading permafrost. Research into post-mining rehabilitation of landscape (e.g. innovative cover systems, rapid consolidation of mine tailings, etc.) will also be undertaken. Field-based research will also be undertaken on developing effective strategies for rejuvenation of groundwater and surface water resources using micro- and meso-scale topographical alterations (e.g. by constructing micro dams out of naturally-available materials).

[11] National Academy of Engineering (2005). Designing from a Blank Slate: The Development of the Initial Olin College Curriculum. Authors: Kerns, Miller and Kern. http://www.nap.edu/openbook.php?record_id=11338&page=1 (accessed Oct 13, 2014).

For the newly established Department of Civil Engineering, the development of the graduate program is a defining moment, consistent with its objective for excellence in research and education. Operation of a graduate degree program brings several tangible and long-term benefits to the realization of the Department's mission as an educational and research-oriented entity. With the first cohort of Civil Engineering undergraduate students admitted in Fall 2014, the development of the graduate program will also fulfill the needs for graduate students to support the undergraduate program through teaching assistantships in the undergraduate course delivery, marking of papers, and engaging undergraduate students in their own experiments as lab assistants. The activity at the graduate level and organized inflow and outflow of MASc and PhD students will leverage the faculty's research, and it will provide the necessary perspective and stimulus for the undergraduates for excellence and higher pursuits through contact with the state of the art research conducted in the departmental laboratories within the framework of the graduate program requirements.

The objective of the Department to rise into a leadership position in civil engineering education in Ontario is also consistent with the creation of the graduate degree program. It is expected that the availability of a graduate degree option following the bachelors' degree will attract better undergraduate students that are more committed to engineering as it will make the enthusiasm for innovation and participation in discovery more visible and tangible to the undergraduates. Another important role of the regular intake of graduate students is safeguarding the accumulation of lab-specific expertise acquired during execution of experimental work and/or advanced computer-software; in this manner, outgoing graduate students will be able to transfer technical know-how to incoming ones securing continuity of investment of time and human resources.

With reference to the objectives of the University, it is noted that York University's strategic planning had included the establishment of engineering programs since its inception in 1959, a goal that is now being implemented through the programs in the Lassonde School of Engineering. The University Academic Plan (UAP) for the period 2010-2015 sought expansion of the Engineering Faculty and explicitly encouraged the creation of new graduate programs in Engineering or together with other interdisciplinary fields of study, consistent with the objective of creating a comprehensive University. Thus, along the same lines, the proposed program is consistent with the Senate's approval to establish the Lassonde School of Engineering. It is expected that a graduate program in Civil Engineering, which is one of the oldest and most established engineering disciplines, will contribute effectively in the realization of the objective to expand the engineering faculty, forming an organic component in the second tier of expansion of the Lassonde School of Engineering.

The objectives of the program to set up the infrastructure for a fully-fledged graduate curriculum that will involve Graduate Thesis research thereby leveraging the research output of the department is also consistent with the 2013-2018 York University Strategic Research Plan (YUSRP)[12], which places emphasis on engineering research. The Department's stated emphases, which are also transferred to and guide the inception of the graduate program, in the areas of Infrastructure Management, Resilience to climate-change-driven Extreme Events, and Sustainable Development, align with YUSRP's vision of "facilitating the scientific and technological breakthroughs for the 21st century to meet the challenges of environmental sustainability, the prevention and treatment of disease, and the development of new materials and devices to make Canadian products competitive in the global marketplace".

In line with the Lassonde School of Engineering's Renaissance Engineer™ philosophy, the program's objectives also respond to the needs of the society for more highly-trained engineering specialists in order to deal with the daunting infrastructure issues of the greater metropolitan area of Toronto, but also for Canada's strong demands in the specialty areas of growth and development. The complexity and scale of modern engineering challenges require highly trained professionals who carry a holistic education that crosses the boundaries imposed by the conventional fragmentation of the discipline and goes beyond the strict technical skills including awareness and sensitivity to the needs of society. The program targets for this profile for its graduate students by delivering the basic course material through a versatile cluster of modules in order to enable students to shape their own course profile in the chosen sub-discipline of specialization. Course requirements include a spine of core courses and several satellite modules that give flexibility to the graduate student to focus on aspects of interest; to achieve its educational objectives the program combines independent learning procedures, and complementary training beyond the core discipline.

The Lassonde School of Engineering at York University has launched a new $1.5 million challenge to become the first engineering school in Canada to reach a 50:50 gender balance. [13] The proposed program is

[12] York University's Strategic Research Plan: 2013-18. Available at: http://srp.info.yorku.ca/files/2013/04/SRP-final-april25.pdf (accessed on Oct 13, 2014).
[13] The Lassonde 50:50 Challenge. http://lassonde.yorku.ca/5050 (accessed Mar 13, 2015).

strategically well placed to play a crucial role in achieving this goal. The Department already boasts the highest female-to-male faculty complement of 33% within the Lassonde School of Engineering and is committed to increasing this ratio to parity. It is envisaged that achieving and demonstrating gender balance in our faculty complement, will enable a gender balance within the graduate student population.

In summary, the inception of the proposed Civil Engineering graduate program is an essential lever for the development of the Department of Civil Engineering, consistent with its objectives to evolve into a leading academic entity in engineering, but also with the expansion plan for engineering at the University represented by the recent establishment of the Lassonde School of Engineering. The program is also in line with York University's Academic and Strategic Planning agendas, actively defining itself with reference to the needs of Canadian society.

3. Need and Demand

3.1 Identify similar programs offered at York and/or by other Ontario universities, with special attention paid to any innovative and distinguishing aspects of the proposed program.

Until now, York University has had no established graduate programs in Civil Engineering similar to what is being proposed herein. A number of programs in this discipline are offered in many Universities in Ontario including the programs at Carleton, Guelph, Ottawa, McMaster, Queen's, Royal Military College of Canada, Ryerson, Toronto, Waterloo, and Western; all these Universities have established research-based (MASc) and course-based (MEng) programs, whereas several universities also offer PhD programs. Several more Civil Engineering graduate programs are offered at the national level, in light of the fact that Civil Engineering is an established broad field that spans an extensive range of sub-disciplines associated with the natural and the built environment (from construction and structural design, to geotechnical and soil works, transportation, hydraulics, water treatment, river and coastal engineering, remediation and protection of the environment, building science, etc.). According to Engineers Canada, a graduate degree is an asset in today's conditions as there is an expected rise in demand for highly trained specialists throughout the country. Employment opportunities for specialists in non-conventional, multi-disciplinary areas are even greater, as new areas emerge in this continuously expanding discipline. Graduates of Civil Engineering graduate programs are in high demand in the private sector in the areas of development, energy resource exploration, infrastructure maintenance and rehabilitation, natural resource management, and other frontier sectors of economic development as well as in Universities, government and non-profit organizations.

The MASc and PhD degree programs are by definition the mechanisms for systematic training of research engineers, and for contributing, through research, towards sustainable advancement of the frontiers of knowledge. Through admissions screening criteria, the student average academic level is very competitive, to the extent that expectations are high both, on the parts of the graduate students and the faculty, so that a very rigorous expansion in research is anticipated. The graduate degrees that are pursued in this proposal, express the Department's commitment for an immediate engagement in Ontario's priority for contribution to the creation of new knowledge in science and technology, particularly addressing Ontario's innovation agenda[14] as well as that of Canada[15].

At this point it is relevant to note that throughout the developed world there are two types of graduate programs in Engineering, namely Research-Based and Course-Based. To provide relevant context a brief analysis of the typical structure of graduate programs belonging in either of the two categories is included here:

> Research-Based programs include Master of Applied Science (MASc or MSc or other similar acronyms with an emphasis on Science) and Doctoral (PhD) degrees. Program duration is usually 18 to 24 months for the MASc and 36 to 48 months for the PhD; the focus of training is specialization in a relatively narrow sub-discipline secured through a limited number of courses (usually between four and six one-term graduate courses for the MASc degree, and three to five one-term courses for the PhD degree), where a major component of the degree requirements and the culmination of the student's achievement is a research thesis. Upon completion of course requirements PhD students usually have to pass a comprehensive exam in their knowledge area before advancement to candidacy. Active participation in all the necessary steps towards understanding and solving an open problem by conducting research for their thesis, is a process that also involves use of resources, conceptual development of a methodology and actual implementation as well as presentation and defense of the thesis work to a committee of experts. All these activities embedded as rudimentary requirements for a thesis, are intended to reinforce a large array of skills and processes, such as critical thinking and effective communication of findings. It is also intended to attract the students into a research career path by exposing them to the excitement necessarily attached to the genesis and production of new knowledge or expansion of knowledge in un-trodden ground. Generally, it is expected that students that take up the option for an MASc degree be streamlined to doctoral studies albeit not in a strict sense. In other words, PhD students have usually but not necessarily completed an MASc degree. Research-based degrees may

[14] Ontario's Innovation Agenda: Seizing Global Opportunities. http://www.ontario.ca/innovation (accessed Oct 13, 2014).
[15] Innovation Canada: A Call to Action. Review of Federal Support to Research and Development – Expert Panel Report. Available at: http://rd-review.ca/eic/site/033.nsf/vwapj/R-D_InnovationCanada_Final-eng.pdf/$FILE/R-D_InnovationCanada_Final-eng.pdf (accessed Oct 13, 2014).

be either focused in the area of a sub-discipline of Civil Engineering (i.e., Structural, Geotechnical, Hydraulics, Construction Management), or may be collaborative programs between divisions or departments, spanning over different disciplines or sub-disciplines.

Course-Based Programs lead to a Master of Engineering degree, which is an alternative option for a post-graduate specialization – the established degree distinction is MEng. It is a course-based program, with a course load ranging from eight to twelve one-term graduate courses. Here, the intensity of effort is in the rapid transfer of knowledge and skills to graduate engineers who work or will work in the Industry. Depending on the emphasis of the MEng program, a small research thesis project may replace requirements for one to two course equivalents, whereas in other cases collaborative graduate programs enable training in multi-disciplinary areas spanning different departments. The creation of the MEng program in Civil Engineering at Lassonde is under a separate proposal.

An important demographic characteristic of the MASc students is that they are recent graduates; students may choose to pursue an MASc instead of an MEng degree because they are attracted to the prospect of a PhD, but occasionally the availability of funding in the form of an RA (research assistantship) which is available strictly to students engaged in research is also a motive. Note that full-time graduate students enrolled in a an MASc or a PhD degree program qualify and - based on Ontario practice –they will receive, upon admission, financial support in the form of research assistantship, teaching assistantship, and/or scholarships and partial tuition waivers. Thus, MASc programs generally attract full-time students as opposed to the MEng programs, which usually attract mature professionals who often opting for the part-time option to accommodate a working career.

The proposed graduate program planned in the Department of Civil Engineering at Lassonde is a research based program leading to MASc and PhD degree options based on admission qualifications, departmental planning and student applications. Its objective is to contribute to innovation by advancement of the knowledge frontiers in the discipline as articulated in Ontario's Innovation Agenda[16]. The program encompasses advanced Civil Engineering courses required to train the graduate engineers but also to support with underlying knowhow the research activities in advanced areas of the discipline. Because course delivery will be jointly offered to both, the research (MASc and PhD) and the applied options (MEng) it is deemed necessary to make use of modern educational technologies and methods of course delivery known collectively as blended learning, since courses that require physical presence will be offered in the evenings or in special intensive sessions over brief periods.

The unique aspects of the proposed program are prevalent among several discipline directions: (a) The thematic areas for research intensity and teaching which are organized according to today's globalized agenda in civil engineering, namely **Infrastructure**, **Resilience**, and **Sustainability**; (b) the mode of delivery; and, (c) the structure, its motivating principle being to enable diversification, in full appreciation of the continuously expanding and evolving scope of the Civil Engineering discipline, and the need to allow tailoring of the program according with the needs and objectives of the individual students and the industry. At the heart of the program's unique structure lies the need to cross established sub-discipline boundaries, allowing for novel considerations – such as sustainability – to influence, through targeted research and knowledge development, the decision making and methodologies used in practice. The program also aims to expose graduate students to important complementary areas (for example: transfer and commercialization of technology; ethical, legal and entrepreneurial aspects of engineering practice; professional communication; and, environmental stewardship) in addition to their research projects. Such approach is closely aligned with the vision of the Lassonde School of Engineering of producing Renaissance Engineers™ – entrepreneurs with solid technical education combined with social conscience and a sense of global citizenship.

The proposed graduate program allows for a modular organization of the course material so that together with blended learning procedures a phased learning experience may be enabled. This is consistent with recent trends in higher education (MIT report) and it has the added benefit to also allow for a negotiation between breadth of scope (several horizontal modules) and depth of specialization (vertical modules), so that it will be seamlessly used as the course framework for the simultaneous deployment of the MASc, PhD course requirements and the shared MEng curriculum.

The concept of modular delivery specially designed for engineers currently working in industry is offered in the area of mechanical engineering by the Advanced Design and Manufacturing Institute (a partnership of

[16] Ontario's Innovation Agenda: Seizing Global Opportunities. http://www.ontario.ca/innovation (accessed Oct 13, 2014).

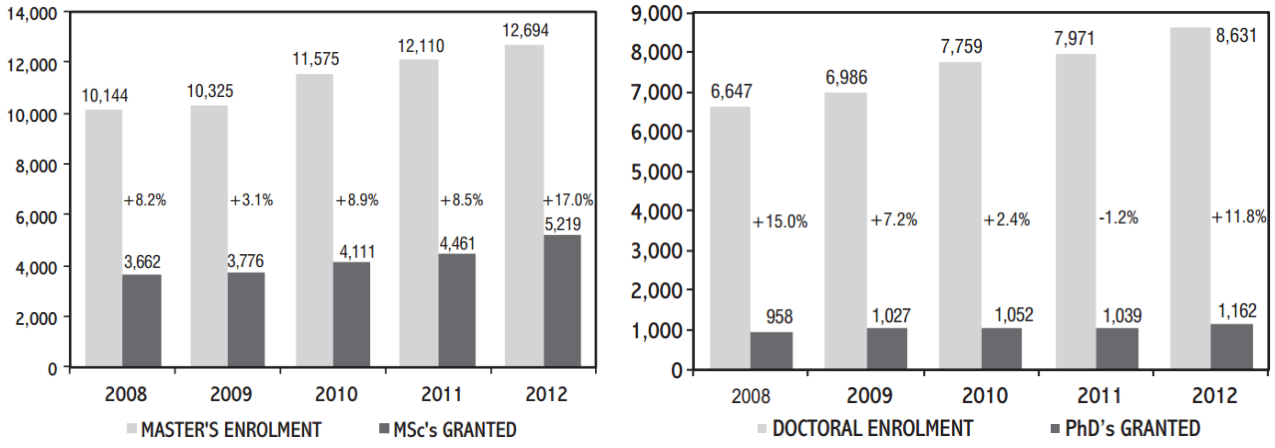
University of Toronto, McMaster University, Queens University, and Western University). Experience from this has illustrated in practice the facility of the modular approach towards achieving multi-disciplinarity (breadth of scope). Particularly targeting the breed of engineers who will undertake roles of responsibility in management and planning of civil engineering works, the program will:

- Use complex projects as a vehicle for development of an interdisciplinary mindset.
- Highlight the importance of holistic design and assessment in securing resilience of civil engineering works.
- Place emphasis on the development of computational skills but also on professional qualities.

An added unique feature of the program is the inclusion of complementary training in important non-technical areas known collectively as soft-skills (leadership abilities, competent communication, independence, teamwork, visionary cognizance of the societal issues, ethical and intellectual property issues, environmental obligations, appreciation of the bounds of current knowledge) beyond the courses within the discipline. This aspect is expected to benefit both, the student and the receiving community. The complementary characteristics are deemed essential attributes of engineering leadership. That is, entrepreneurial engineers with a social conscience and a sense of global citizenship envisioned by the Lassonde School's profile of the Renaissance Engineer™.

3.2 Provide brief description of the need and demand for the proposed program, focusing as appropriate on student interest, social need, potential employment opportunities for graduates, and/or needs expressed by professional associations, government agencies or policy bodies.

Given the pivotal role of Civil Engineering as a tool for economic development, job creation and overall improvement of quality of life, the employment trends of its graduates follow closely the indices of the economy. Pursuing graduate degrees in engineering has been on the rise for several years, with current annual enrollment according with Engineers Canada corresponding to about 30% of the total body of graduating students – that is, one in three active engineers will, at some point in their career, enroll in a graduate program of specialization leading to either an MASc, MEng or PhD degree in Engineering. According to a survey report on enrolment trends from 2008 to 2012 issued by Engineers Canada[17], conducted among 49 Canadian Universities that offer Engineering Programs, trends reveal continuous growth in enrolments and graduations (Figs. 3.2.1(a) & (b)).



(a) (b)

Figure 3.2.1: (a) Enrolment in Master's programs; (b) Enrolments in doctoral programs[18]

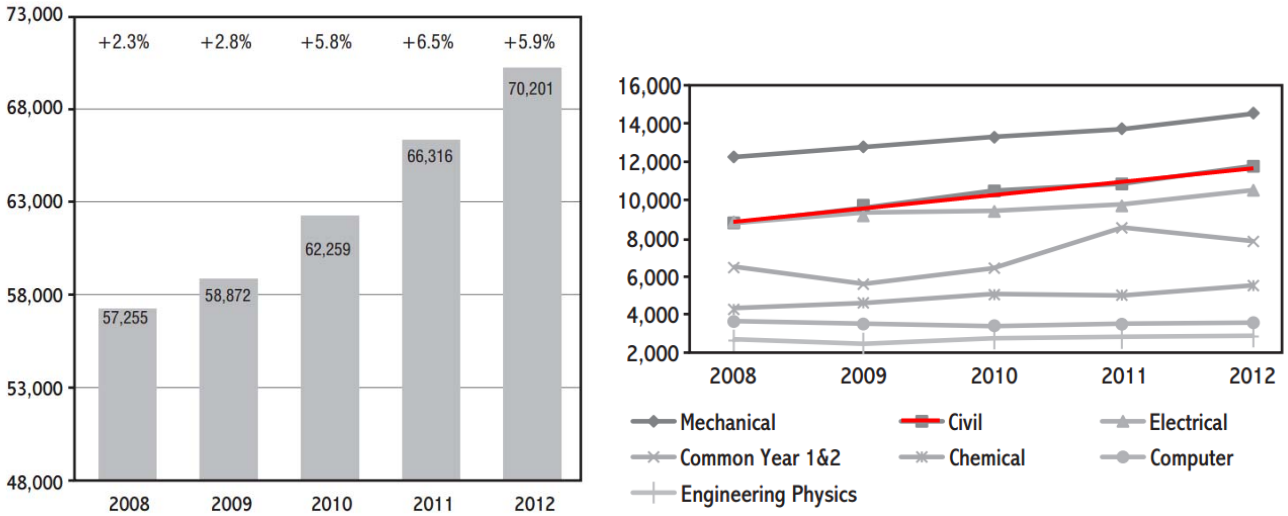
These trends are followed faithfully when the subgroup of students in Civil Engineering is considered. Being situated in the midst of the metropolitan area of Toronto, the undergraduate program at York University is

[17] Engineers Canada (2013). Canadian Engineers of Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2008-2012. Available at: http://www.engineerscanada.ca/sites/default/files/sites/default/files/enrolment_report_2012_eng.pdf (accessed Oct13, 2014).

[18] Engineers Canada (2013). Ibid.

already very appealing to students with the number of applicants in the first cohort to enter the program far surpassing the available positions. The same trend is anticipated to even a higher degree at the graduate level since the city is a central hub of several important construction and design/consultancy firms and government institutions that employ large numbers of Civil Engineering specialists. This is an informed projection based on recently published surveys conducted by Engineers Canada, exploring graduate enrolments and employment market pressures in the various disciplines of engineering. The above-mentioned survey report[19] sums up its findings in the statement: "Students of engineering are reminded that the accumulation of skills within a particular field of engineering, along with strong communications, organizational, and leadership abilities are essential to a progressive career in engineering."

But beyond student interest which is forged to a significant extent by market pressures in employment opportunities, the relevance of a Civil Engineering graduate education with societal needs comes out freely from Ontario's Innovation Agenda[20] and the State of the Nation 2012 report by Canada's Science, Technology and Innovation Council (STIC)[21]. For one, infrastructure development and management, Northern development, exploitation of oil-sands, clean water – all falling within the realm of Civil Engineering practice – are identified as high priorities in the agenda of the country. At the same time the report issues alarming statistics about Canada's eroding relative position on a number of knowledge and talent development indicators quantified by the number of graduate students entering and staying in the productive force of the economy as engineers, concluding that Canada risks erosion of its competitive advantage in these areas. Furthermore, the State of the Nation 2012 report states that "Canada also continues to face challenges related to knowledge transfer—in effectively moving knowledge developed in higher education institutions to companies that have the ability to absorb it and translate it into commercially viable products and/or solutions to health, environmental and social problems."



(a) Undergraduate Enrolment (Accredited Programs only; FTE) (b) Undergraduate Enrolment by Program (FTE)

Figure 3.2.2: Undergraduate enrolment trends in engineering programs across Canada[22]

Ontario has been and continues to be the most preferred educational destination in Canada, with Civil Engineering being only second to Mechanical Engineering in terms of undergraduate student preferences, and being only second to Electrical Engineering in terms of graduate student enrolment numbers[23]. Considering that the domestic undergraduate programs constitute the largest pool for recruitment of graduate students in Canada, it is of interest to note that 42 percent of students were enrolled in Ontario. For example, in 2012, undergraduate student enrolment was over 70,000 full-time equivalents (FTEs; see Fig. 3.3.2(a)) of which nearly 30,000 FTEs, studied in Ontario. About one in six students majored in Civil Engineering (nearly 12,000 FTEs for 2012; see the enrollment breakdown per discipline depicted in Fig. 3.2.2(b)), which, for typical 4-year

[19] Engineers Canada (2013). Ibid.
[20] Ontario's Innovation Agenda: Seizing Global Opportunities. http://www.ontario.ca/innovation (accessed Oct 13, 2014).
[21] STIC (2013). State of the Nation 2012 Report. Available at: http://www.stic-csti.ca/eic/site/stic-csti.nsf/eng/h_00058.html (accessed Oct 13, 2014).
[22] Engineers Canada (2013). Ibid.
[23] Engineers Canada (2013). Ibid.

programs corresponds to about 2200 students graduating with a Civil Engineering Degree in the country per year. This number represents the core pool of candidates for the Master's degree programs (this is only an indicative number, as a large fraction of the graduate student body comprises foreign students). Also note that Civil Engineering enrolment continues to grow, with more than 30% increase when compared to the 2008 data; therefore, the demand for graduate degrees of specialization is expected to continue to increase in the next several years. At the graduate level the total number of enrolments in engineering (Master and PhD combined) was more than 23,000 FTEs in 2012, following the same or higher growth patterns as the undergraduate degree programs[24]. This means that roughly 33% of the student population in the engineering programs was pursuing graduate studies in 2012.

The breakdown of the total number of enrolled graduate students per degree and discipline is listed in Tables 3.2.1(a) and (b). Note that the representation of Civil Engineering in the total number of enrolments (i.e., one in six) is preserved at both degree levels; again Civil Engineering is high in student representation, notwithstanding the fact that several Environmental Engineering, Mining or Mineral Engineering and Geological Engineering degree programs spin-off from Civil Engineering Departments through collaborative and interdisciplinary degree programs with other departments. Considering that the average time to graduation of a Master Degree is about two years, the enrolment indicates that the cohort of Master students in any given year is approximately half the number of fourth-year undergraduates; in a closed system this would imply that every second graduating engineer continues at some point with a graduate degree; however, this analysis should be interpreted cautiously since the international student representation increases at the graduate level, to the extent that only 30% of domestic students (about one in three) are likely to pursue a graduate degree program in engineering during their career.

Table 3.2.1: (a) Total FTE Master's students by discipline; (b) Total FTE doctoral students by discipline

(a)

DISCIPLINE	2008	2009	2010	2011	2012
Biosystems	349	409	387	442	382
Chemical	708	835	935	1082	1099
Civil	1728	1776	1871	2068	2060
Computer	299	285	312	337	322
Electrical	3089	2723	2967	3014	3432
Engineering Physics	159	145	153	167	202
Environmental	223	226	243	270	268
Geological	27	25	44	20	19
Industrial or Manufacturing	284	278	339	403	392
Materials or Metallurgical	187	230	243	224	246
Mechanical	1680	1748	1995	1958	2083
Mining or Mineral	152	121	137	160	160
Software	147	138	164	177	203
Other	1112	1379	1785	1805	1826
TOTAL	**10144**	**10319**	**11575**	**12126**	**12694**

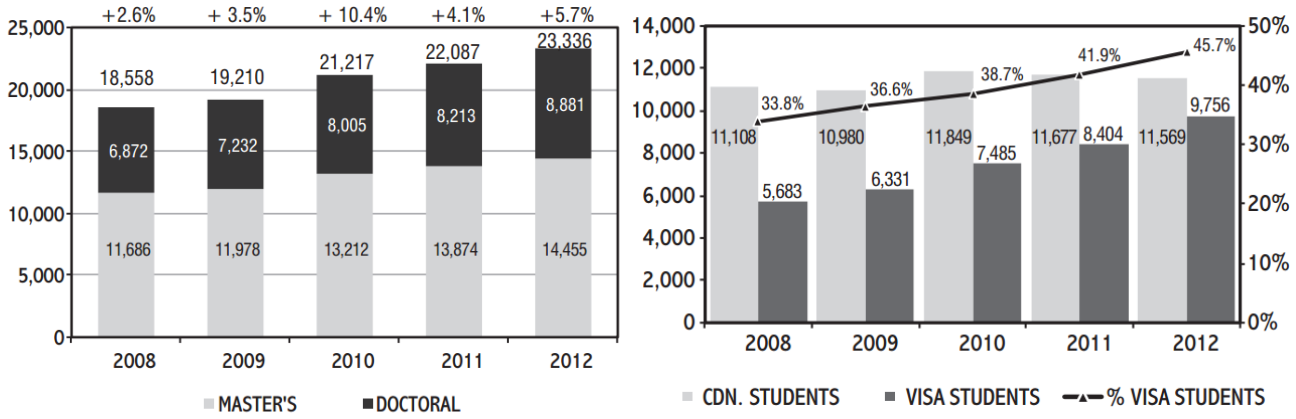
(b)

DISCIPLINE	2008	2009	2010	2011	2012
Biosystems	242	328	359	400	325
Chemical	679	748	822	870	1076
Civil	1017	1094	1145	1191	1282
Computer	118	123	142	157	156
Electrical	2068	2079	2243	2230	2445
Engineering Physics	173	169	217	174	211
Environmental	90	88	99	97	99
Geological	6	9	13	7	8
Industrial or Manufacturing	127	122	144	224	176
Materials or Metallurgical	185	261	318	273	375
Mechanical	1106	1156	1340	1340	1495
Mining or Mineral	140	86	90	102	101
Software	9	18	16	18	18
Other	686	705	812	894	863
TOTAL	**6647**	**6986**	**7759**	**7979**	**8631**

According to the Engineers Canada report[25], about 13% of undergraduate students in Civil Engineering in Canada are international students (visa holders); this number is substantially higher at the post-graduate level (see Figs. 3.2.3 and 3.2.4). Evidently, education towards a graduate degree in Civil Engineering in Canada is also in high demand among international students who have completed a Bachelor degree in a foreign program, including immigrants to Canada, who need to be acquainted with the Canadian engineering codes of practice and state-of-the-art design methods and standards in order to pave their entry to working in the Industry. Thus, about 45% of all graduate enrolment is from foreign students and according to the Engineers

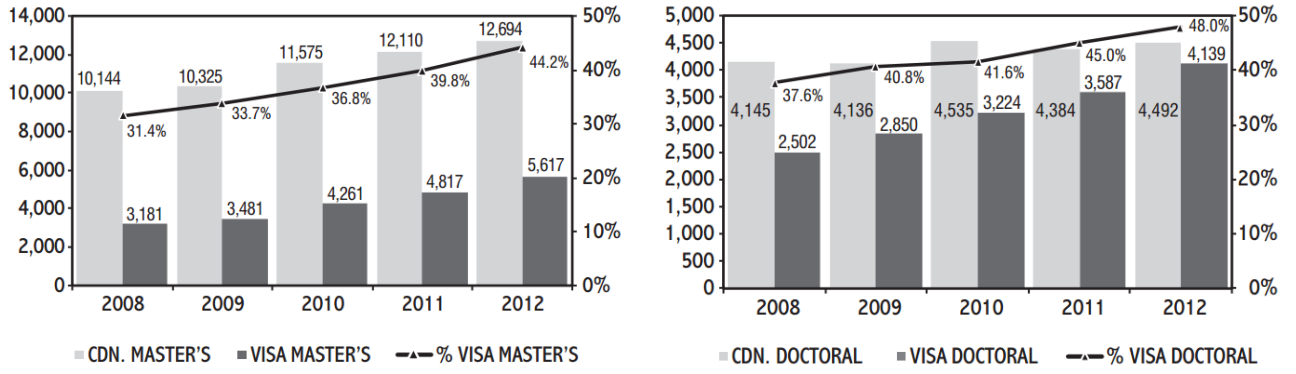
[24] Engineers Canada (2013). Ibid.
[25] Engineers Canada (2013). Ibid.

Canada report[26], this proportion is on a steady rise that far outpaces the growth in Canadian student graduate enrolment (Fig. 3.2.3(b)). Note that in the province of Ontario the total number of doctoral students was 3103 in 2012, whereas the number of Master's students was 4814; of those, foreign students accounted for 1163 and 1759 FTEs, respectively. Of the total number of Ontario students, about one third study in the Metropolitan Toronto area (University of Toronto and Ryerson University) and about 90% in the universities of Southern Ontario.



(a) (b)

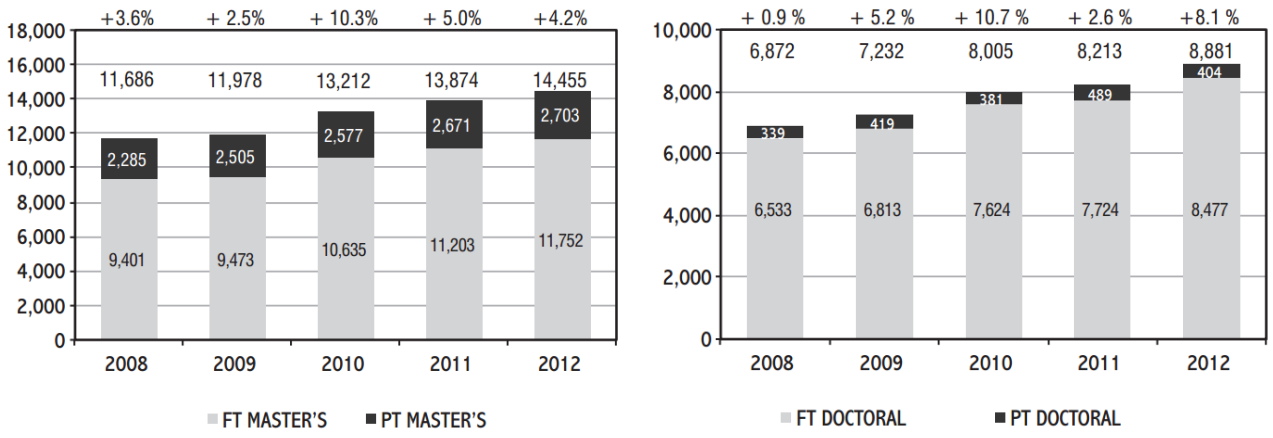
Figure 3.2.3: (a) Graduate enrolment and growth trend at the Masters and PhD levels in Canadian Universities; (b) Representation of Canadian and Visa Students in the graduate student population[27]



(a) (b)

Figure 3.2.4: Breakdown of graduate enrolment at (a) the Master's and (b) PhD level, respectively, between Canadian and Visa Students[28]

[26] Engineers Canada (2013). Ibid.
[27] Engineers Canada (2013). Ibid.
[28] Engineers Canada (2013). Ibid.



(a) (b)

Figure 3.2.5: Distribution of Full-Time vs. Part-Time students (a) at the Masters level, and (b) the PhD level in engineering graduate programs in Canada[29]

Of the total number of students at the Masters level, about 20% are part-time students on average, whereas this percentage is much lower at the PhD level (Figure 3.2.5). Diversity representation hovers also about 20% in Civil, being boosted at the graduate level by foreign female students, and fluctuating about this mean depending on the province.

The above data clearly illustrate the attractiveness of Civil Engineering education among students and the perceived importance of post-graduate education in Civil Engineering in the province, particularly since investment in infrastructure projects and international consultancy abroad (being major employers of Civil Engineers) are considered major expansion forces in Canada. This is associated with the continuing growth of employment prospects in Civil Engineering at the National and Provincial Levels, albeit owing to the global debt management crisis and spending cutbacks, expansion due to economic growth is, and will remain weak. Based on a broad analysis of the engineering labour market four major parameters determine engineering job creation, namely, (a) economic growth and expansion, (b) replacement demand due to retirement of the ageing engineering population, (c) availability of specialists trained through post-graduate programs and (d) immigration.

Apparently, the attrition in number of professional engineers because of retirement generates significant pressures that may seriously erode the ability of the engineering firms to continue being competitive in the International market. In this context, the latest Engineers Canada report on the prospects of the Engineering Labour Market[30] raises the alarm about the impeding shortage of highly skilled upper level professionals, underscoring the need for professional specialization of the Engineering graduates:

> *"…requirements to replace retiring engineers far exceed the number of new jobs created by economic growth. This contributes to a skills shortage that is most acute in the market for specialized engineers with over ten years of experience. There is an abundance of young engineering students enrolled in and completing engineering programs but lacking practical skills. As this labour pool grows, there is a coincident increase in engineers arriving as Temporary Foreign Workers to fill job vacancies. Many of the Temporary Foreign Workers will stay in Canada permanently."*[31]

Indeed, according to this report, the average age in the Civil Engineering work-force is at 42.5 years, the highest among all engineering disciplines. So replacement openings at the higher echelons of the profession will dominate demand, necessarily dictating the requirement for advanced qualifications in the form of a specialized Masters Degree or at least 10 years of experience – as this replacement process takes place, new hires needed should have the capacity to handle responsibility and offer initiatives commensurate with the role of a professional Civil Engineer; these skills may be acquired relatively quickly through a Masters degree, and

[29] Engineers Canada (2013). Ibid.
[30] Engineers Canada (2012). The Engineering Labour Market in Canada: Projections to 2020. Final Report, October 2012. Available at: http://www.engineerscanada.ca/sites/default/files/w_Engineering_Labour_Market_in_Canada_oct_2012.pdf (accessed Oct 14, 2014).
[31] Engineers Canada (2012). Ibid.

even more so through a doctorate, both degrees being considered in the job market as determining assets (for levels of responsibility commensurate to each degree, respectively).

Economic growth as a job creation force will intensify mildly the replacement factor. Specifically, in Ontario, according to the same report, resource projects in the North and infrastructure development in most other regions of the province will lead to job creation, causing significant supply pressures (a level of 4 on a scale of 1 to 5 where 1 represents very weak demand and 5 corresponds to a very strong demand) for Mining and Civil engineers (see Table 3.2.2).

An analysis of patterns of job creation in the field of Civil Engineering projects steady growth in Ontario following the national trends (Fig. 3.2.6 (a) and (b).) Construction shows limited growth from 2012 to 2020 while undergoing many shifts in the mix of activity, with building shifting from residential to non-residential from 2010 to 2020 (major engineering, resource and infrastructure projects in areas like oil and gas, electricity, pipelines, transit and mining). As this activity is engineering intensive, construction related engineering employment is expected to rise above current record levels. Outside of strength in resource and infrastructure projects in the West, most engineering labour markets will expand by less than 10% from 2011 to 2020[32]. Consulting Engineering (architecture, engineering and related services industry) with engineering exports services in the international market, employs 40% of the engineering workforce. A rising share in increasing international opportunities for engineering consultancy for Canadian firms is expected to add to expansion demands and create significant supply pressures, in the range of 15% from 2012 to 2020. Canada has a major international presence in this area - exports of engineering services grow with the demand for specialized engineering services from outside Canada related to the resource engineering, manufacturing and investment activity[33].

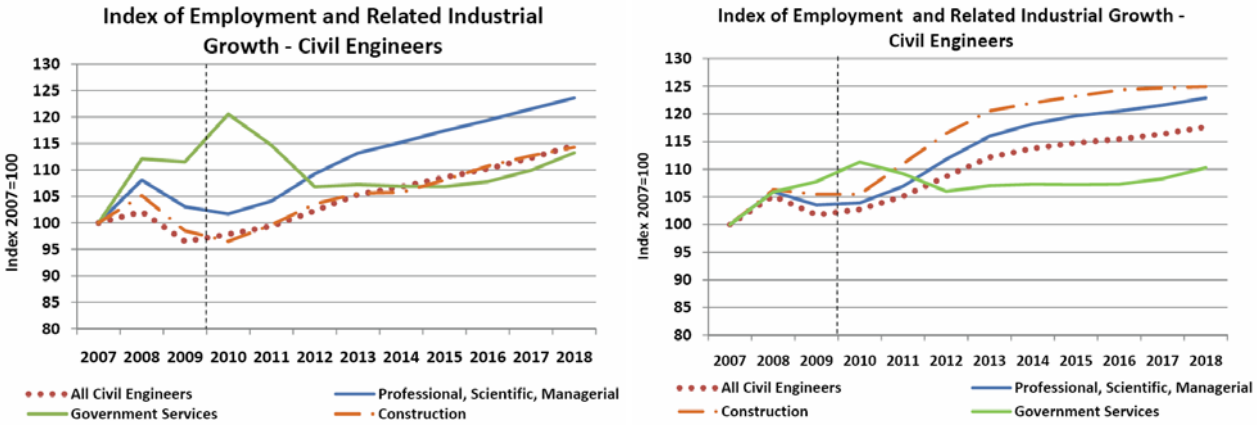
Government services are the weakest component in job creation for engineers, expected to be near 10%, due to restraint in public spending driven by restrictive fiscal policies. The employment projections that drive market assessments often include relatively strong municipal and provincial government capital spending, notwithstanding the announced fiscal policy, due to local priorities for infrastructure spending in areas like electricity and transit. Utilities and Transportation are a strong source of employment in several provinces, often linked to development of resources. The main driving forces are major electricity projects that cover generation, transmission and distribution as well as renewable energy work in wind and solar. Major transportation projects are planned for highways, transit systems, bridges and related infrastructure as well as pipelines.

Table 3.2.2: Intensity of supply pressures (demand) on engineering specialists according to discipline[34]

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Civil engineers	3	3	3	4	3	4	4	4	3
Mechanical engineers	3	3	3	3	3	3	3	3	3
Electrical and electronics engineers	3	3	3	3	3	3	3	3	3
Chemical engineers	2	2	2	2	2	2	2	2	2
Industrial and manufacturing engineers	4	3	4	4	4	4	4	3	3
Metallurgical and materials engineers	2	2	2	3	2	2	2	2	2
Mining engineers	4	3	4	4	4	4	3	3	3
Geological engineers	2	2	3	3	3	3	3	3	3
Petroleum engineers	3	2	3	3	3	3	3	3	3
Aerospace engineers	4	3	4	3	3	3	3	3	3
Computer engineers (except software engineers)	3	3	3	4	3	3	3	3	3
Other professional engineers, n.e.c.	3	3	3	3	3	3	3	3	3

Source: Prism Economics & Analysis

[32] Engineers Canada (2012). Ibid.
[33] Engineers Canada (2012). Ibid.
[34] Engineers Canada (2012). Ibid.



(a) (b)

Fig. 3.2.6: History and projection of demand for Civil Engineering professionals (a) at the National Level; and, (b) in Ontario[35] [Note: An older version of the Engineering Labour Market Conditions report was consulted for the above-mentioned plots because the latest version of the report does not contain such plots.]

In summary, the primary conclusions regarding projections for the employment opportunities for Civil Engineering professionals in the next few years are that:

- High and increasing replacement demand far exceeds the expansion demand;
- In the longer term replacement demands will drive expansion demands even higher due to ageing of the population in Canada;
- Demands are driven by resource and utility / infrastructure employment; and,
- The graduates entering the workforce do not resolve the needs for experienced, professional engineers.

The labour market is divided with recruiting challenges for mature engineers with specialized skills or 5-10 years of experience, while new graduates from engineering programs may have difficulties finding a job.

The above conclusions underscore the mounting need for specialized professionals in Civil Engineering that would be qualified to assume the mid- or higher-level jobs in the discipline in Canadian Engineering consulting firms and the government sector. To contribute towards balancing supply and demand the report recommends a number of actions, some of which are very relevant to the post-graduate program development, namely:

- To retain older engineers in the workforce longer and to add targeted programs that will accelerate the on the-job learning of new graduates;
- To adapt post-graduate programs so as to meet the specialized needs of employers;
- To aim for added flexibility and portability of specialized engineering services across regions and different specialties (interdisciplinarity); and,
- To recognize undergraduate engineering degrees as foundation education that is linked to post-graduate specializations.

With reference to the needs of Canadian society, Civil Engineers play a material role in improving and safeguarding the quality of life of the average citizen through their work in managing and creating the built environment.[36] But in a broader sense, beyond the narrow scope of the discipline, the Ontario Innovation Agenda[37] links societal prosperity and the future and wellbeing of the Canadian society with innovation and facilitation of knowledge creation and transfer. According to expert opinion cited by this report as well as by the State of the Nation report 2012[38], knowledge production and transfer are deemed the vehicles of growth of the economic development in the new highly competitive international market:

[35] Engineers Canada (2010). Engineering Labour Market Conditions 2009-2018. Final Report, September 2010.
[36] ASCE (2009). Ibid.
[37] Ontario's Innovation Agenda: Seizing Global Opportunities. http://www.ontario.ca/innovation (accessed Oct 13, 2014).
[38] STIC (2013). Ibid.

"At the heart of the innovation process are the people who generate the ideas and knowledge that power innovation, and then apply this knowledge and the resulting technologies, products and services in the workplace and as consumers."

Therefore, training postgraduate-level students with R&D talents who can directly contribute to advancement of innovation in key economic growth sectors in Ontario is an urgent priority: according to statistics that are cited in the State of the Nation Report, Canada lags behind many OECD countries in investment to innovation and in effective knowledge transfer from higher education institutions to the industry – which depends entirely on the training of its leaders with R&D expertise, interdisciplinary skills, entrepreneurial characteristics and a comprehension and cognizance of professional and societal needs at a global level. Interestingly, despite the leadership position of Canada (and the province) in undergraduate education, the nation lags behind other competing OECD countries in training of graduate students. Increasing the number of graduate student training, and also creating career opportunities that would retain the graduates after completion of their degrees in the province are Ontario's challenge in its effort to maintain and improve its R&D record.

In this regard, the vital role of research based graduate program, such as the one proposed herein is in line with societal expectations: Graduate holders of an MASc or a PhD degree represent the investment in R&D talent who can contribute through the advancement of knowledge to the Province's innovation capital. Their expertise in research and additional skills systematically built through the emphasis of the proposed program will place them in the higher positions of the workforce. Their actions and decisions will help determine the success of companies in the global marketplace. Ontario's economy depends on R&D to maintain its competitive edge in key technological sectors: in Ontario's Innovation Agenda, from among the highlighted areas of growth where Ontario already holds an important position in the global market as well as the areas of its strategic development, infrastructure, northern development, energy, international consultancy (export of engineering services), resource engineering and the emergence of novel materials and technologies in construction are the areas where highly-trained Civil Engineers can make significant contributions. These considerations have determined the thrust of the proposed programs' initiative, continuing from the already established Undergraduate agenda: A focus on infrastructure, sustainability, and resilience to climate-driven extreme events, with an emphasis on interdisciplinarity, state of the art technical capabilities, and professional skills and experiences that will prepare the graduates for roles that exceed the realm of their technical discipline.

4. Program Content and Curriculum

4.1 Describe the program requirements, including the ways in which the curriculum addresses the current state of the discipline or area of study. Identify any unique curriculum or program innovations or creative components.

The proposed research-based graduate program in Civil Engineering encompasses the design, construction, management and maintenance of the built environment, including infrastructure, transportation networks and structures. Furthermore, it includes technologies to secure clean water, energy, waste management and to protect the natural environment. The objective of the graduate program is to promote scholarly activity focused on basic and applied research, learning and innovation according to established standards of excellence and in compliance with the guidelines of OUCQA's Quality Assurance Framework[39]. According to this Framework, the evaluation criteria should consider the following:

- The ways in which the curriculum addresses the current state of the discipline or area of study;
- A clear rationale for program length ensuring that the program can be reasonably completed within the proposed time period;
- For research-focused graduate programs a clear indication of the nature and suitability of the major research requirements for degree completion;
- Evidence that each graduate student in the program is required to take a minimum of two-thirds of the course requirements from among graduate level courses; and,
- Identification of any unique curriculum or program innovations or creative components.

The scope of the program will address the broader discipline as described above, but it will also expand in related multidisciplinary fields, focusing in the areas that relate to the strategic priorities of Ontario and Canada. Civil Engineering sub-disciplines represented in the graduate program are: Structural Engineering, Geotechnical/Geoenvironmental Engineering, Environmental/Water Resources Engineering and Transportation Systems and Construction Management. However, modern civil engineering problems in engineering practice usually span over several of the above noted sub-disciplines. For this reason, modern training must necessarily cross the boundaries of conventional compartmentalization of the state of the art, in order to emphasize the complex nature of the demands at the higher level of the profession. In this context, as articulated earlier, a cluster of several courses represents each of the areas of specialization of the graduate program in:

- Infrastructure Lifecycle Management, Maintenance and Rehabilitation,
- Resilience to Extreme Events, and
- Sustainable Development.

Each graduate student in the Department of Civil Engineering will work closely with an academic advisor who will act as their Research Supervisor, and will guide the students in planning their course and research related activities as discussed in the forthcoming sections. The supervisor will be identified upon enrollment of the student in the program.

4.1.1 MASc Degree Requirements

Each MASc student will be required to enroll in and successfully complete five one-term courses, at least three of which will be **core courses** (i.e. courses with GS/CIVL rubric) from the Civil Engineering sub-discipline in which the student is pursuing the MASc degree. Of the remaining two courses, one can be a **technical elective** selected either from courses in Civil Engineering that are outside of the sub-discipline in which the student is pursuing the MASC degree, or from courses offered by other Departments within the Lassonde School of Engineering (i.e., Mechanical, ESSE, or EECS), or from courses offered by the Faculty of Environmental Studies (FES) or by the Department of Geography. The last remaining course can be an **open elective**, which can either be another **technical elective** or can be selected from courses offered by other York faculties (e.g., Schulich, Osgoode-Hall, FES, LAPS, etc). Of the five one-term courses, a maximum two courses can be Directed Reading courses. The student should select these five courses after consulting with the student's supervisor and with approval of the Department's Graduate Program Director (GPD). In terms of course modules, the MASc students will be permitted to enroll in up to five Level 1 course modules.

[39] OUCQA (2014). Ibid.

MASc students will be required to register for a non-credit Master's Thesis course for every term during their study period. A thesis supervising committee will be assigned for each MASc student as per the regulations set by the Faculty of Graduate Studies (FGS), York University as described on the FGS's website[40]. Each MASc student will submit an Annual Progress Report (APR)[41] prepared by the student and the student's supervisor(s). A meeting of the student's supervisory committee should be held prior to the completion of the APR. The completed and signed APR should be submitted by the student's supervisor(s) to the GPD. The APR should include the details of completed coursework, the teaching assistantship (TA) duties, published papers and/or reports, participation and presentation at technical conferences and/or meetings, and the supervisory committee's feedback on the overall performance of the student. The student may be asked to undergo corrective measures if the supervisory committee finds the student's progress in the program to be unsatisfactory. Examples of unsatisfactory progress may include the student's failing one or more required courses and the student's lack of substantial research progress between successive two successive APRs.

Each MASc student will conduct and conclude the student's research project and submit a thesis in written form. The student will defend the thesis in an oral examination (viva voce) as per the FGS regulations[42]. A Master's Thesis Examination Committee will be formed for each MASc student as per the FGS regulations[43]. Criteria for examining the thesis will include: academic excellence, innovation, contribution to the state-of-the-art, and quality of both the written thesis and the oral presentation. The student will be required to provide a complete set of all data, experimental techniques, spreadsheets, figures, plots, algorithms and software, and any other materials and devices developed for the purposes of the student's thesis work to the student's supervisor. Unless otherwise agreed upon *a priori* by all parties concerned, that is, the student, the supervisor and the representative(s) from York University, the research work done by the student as part of student's MASc degree program remains the student's intellectual property (IP).

The requirements for the MASc degree also include non-credit complementary activities designed to enhance the students' learning experience over and above the students' acquiring technical core competencies. All MASc students will be required to register for a non-credit Graduate Seminar course for every term during their study period. This course is based on the Department of Civil Engineering's Graduate Seminar Series for which at least twelve seminars will be planned per year. Each MASc student will attend a minimum of ten graduate seminars and will give at least one graduate seminar based on the student's research project as part of the non-credit Graduate Seminar course. All MASc students will also be required to take a non-credit course on Engineering Ethics offered by the Lassonde School of Engineering.

Normal expected degree completion time for full-time MASc students in Civil Engineering is 6 terms (2 years). As per the FGS regulations[44], all requirements for a Master's degree must be fulfilled within 12 terms (4 years) of registration as a full-time or part-time Master's student, in accordance with the FGS Registration Policies.

4.1.2 PhD Degree Requirements

Students enrolled in the PhD degree program in Civil Engineering must have completed a Master's degree in Civil Engineering (or a closely-related discipline). Direct entry into the PhD degree program after completing a Bachelor's degree in Civil Engineering (or a closely-related discipline) will not be permitted. An exceptionally strong candidate who holds a Bachelor's degree in Civil Engineering (or a closely-related discipline) and who does not have a Master's degree in Civil Engineering (or a closely-related discipline) may be admitted to the MASc degree program and may apply for transfer to the PhD degree program only after completing at least one year in the MASc degree program. Such requests for transfer will have to be approved by the student's MASc supervisory committee, the GPD and the FGS on the basis of the student's performance in the MASc degree program.

[40] http://gradstudies.yorku.ca/current-students/thesis-dissertation/supervision/#section1a (accessed Oct 14, 2014).
[41] http://gradstudies.yorku.ca/current-students/regulations/degree-types/#mastersannual (accessed Oct 14, 2014).
[42] http://gradstudies.yorku.ca/current-students/thesis-dissertation/oral-examination/ (accessed Oct 14, 2014).
[43] http://gradstudies.yorku.ca/current-students/thesis-dissertation/oral-examination/#section4a (accessed Oct 14, 2014).
[44] http://gradstudies.yorku.ca/current-students/regulations/degree-types/#masterstime (accessed Oct 14, 2014).

The following three cases are considered for outlining the coursework requirements for PhD students:

Case #1 – A PhD student with a Master's degree in Civil Engineering from the Department of Civil Engineering, York University: Such a student will be required to take three courses, two of which will be **technical electives** and one will be an **open elective**. Here, the terms **technical elective** and **open elective** have the same meanings those outlined above in the coursework requirements for the MASc degree program. These three required courses must be different from the ones taken by the student as part of the student's Master's degree program.

Case #2 – A PhD student with a Master's degree in Civil Engineering (or a closely-related discipline) not from the Department of Civil Engineering, York University: Such a student will be required to take three courses, two of which will be **core courses** and one will be a **technical elective**.

Case #3 – A PhD student who has transferred from the MASc degree program to the PhD degree program, without completing the MASc: Such a student will be required to take two courses, one of which will be a **technical elective** and the other an **open elective**. These two required courses must be different from those taken by the student in fulfilling the requirements of the student's Master's degree program. Normally, MASc students who wish to be considered for transfer into the PhD program will have completed the coursework requirement for their MASc program. Such requests should be made after completion of three terms of full-time study after initial registration and no later than five terms of full-time study after initial registration into the MASc program.

Regardless of under which of the above-mentioned cases a PhD student is considered, the student should select the required courses after consulting with the student's supervisor and with approval of the GPD.

All PhD students will be required to register for a non-credit PhD Thesis course for every term during their study period. A thesis supervising committee will be appointed for each PhD student as per the regulations set by the Faculty of Graduate Studies (FGS), York University as described on the FGS's website[45]. Each PhD student will submit an Annual Progress Report (APR)[46] prepared by the student and the student's supervisor(s). A meeting of the student's supervisory committee should be held prior to the completion of the APR. The completed and signed APR should be submitted by the student's supervisor(s) to the GPD. The APR should include the details of completed coursework, the teaching assistantship (TA) duties, published papers and/or reports, participation and presentation at technical conferences and/or meetings, and the supervisory committee's feedback on the overall performance of the student. The student may be asked to undergo corrective measures or, in exceptionally serious cases, withdraw from the program, if the supervisory committee finds the student's progress in the program to be unsatisfactory, regardless of whether the student has successfully completed the PhD Comprehensive Examination and has met the PhD Thesis Proposal Presentation and Defense requirements.

Each PhD student is required to pass a PhD Comprehensive Examination within the first 12 months of the student's PhD program. It is anticipated that the majority of students will be able to complete this requirement within the first 12 months of their PhD degree program. As such, exceptions to the 12-month time limit will only be considered under exceptional circumstances (e.g. part-time students, personal situations beyond the student's control, etc.) and must be approved by the GPD. The purpose of this exam is to ensure that the PhD students, before being allowed to proceed to their PhD research activities, possess adequate knowledge in the major area of their PhD research project and have the ability to communicate that knowledge to their peers. The students are expected to demonstrate their grasp of relevant basic concepts in mathematics, science and engineering and their ability to use these concepts to solve complex engineering problems. Departmental policies and procedures for conducting the PhD Comprehensive Examination are described in detail in Appendix A.

Each PhD student is required to present a PhD Research Proposal in the form of a formal written document as well as in an open seminar format and to defend it before an Examination Committee within the first 24 months of the student's PhD program. It is anticipated that the majority of students will be able to complete this requirement within the first 24 months of their PhD degree program. As such, exceptions to the 24-month time limit will only be considered under exceptional circumstances (e.g. part-time students, personal

[45] http://gradstudies.yorku.ca/current-students/thesis-dissertation/supervision/#section1ba (accessed Oct 14, 2014)
[46] http://gradstudies.yorku.ca/current-students/thesis-dissertation/supervision/#section1da (accessed Oct 14, 2014)

situations beyond the student's control, etc.) and must be approved by the GPD. The purpose of this requirement is to ensure that the student has conducted extensive literature review and background investigation in sufficient depth on the student's PhD research project to be able to propose an original research program and have the necessary experimental and/or analytical tools to complete the research program. Departmental policies and procedures for conducting the Research Proposal Presentation and Defense are described in detail in Appendix B.

Each PhD student must pass the PhD Comprehensive Examination and successfully defend the Research Proposal in order to be allowed to continue in the PhD degree program. For a student who either fails the PhD Comprehensive Examination or is unsuccessful in defending the Research Proposal after the second attempt, a recommendation will be made to the FGS that the student is required to withdraw from the PhD degree program.

Upon successfully completing the PhD Comprehensive Examination and the Research Proposal Presentation and Defense, each PhD student will be required to conduct and conclude the student's research project and submit a thesis in written form. The student will defend the thesis in an oral examination (viva voce) as per the FGS regulations[47]. A PhD Thesis Examination Committee will be formed for each PhD student as per the FGS regulations[48]. Criteria for examining the thesis will include: academic excellence, innovation, contribution to the state-of-the-art, and quality of both the written thesis and the oral presentation. The student will be required to provide a complete set of all data, experimental techniques, spreadsheets, figures, plots, algorithms and software, and any other materials and devices developed for the purposes of the student's thesis work to the student's supervisor. Unless otherwise agreed upon a priori by all parties concerned, that is, the student, the supervisor and York University, the research work done by the student as part of student's PhD degree program remains the student's intellectual property (IP).

The requirements for the PhD degree also include non-credit complementary activities designed to enhance the students' learning experience over and above the students' acquiring technical core competencies. All PhD students will be required to register for a non-credit Graduate Seminar course for every term during their study period. This course is based on the Department of Civil Engineering's Graduate Seminar Series for which at least twelve seminars will be planned per year. Each PhD student will attend a minimum of ten graduate seminars and will give at least two graduate seminar based on the student's research project as part of the non-credit Graduate Seminar course. Each PhD student will also be required to take a non-credit course on Engineering Ethics offered by the Lassonde School of Engineering, unless the student has previously taken this course as part of the student's Master's degree program.

Normal degree completion time for full-time PhD students in Civil Engineering is 12 terms (4 years). For full-time PhD students who were transferred from MASc program (Case #3 above), the normal degree completion time is also 12 terms (4 years). As per the FGS regulations[49] (http://goo.gl/ZhhhHQ), all requirements for a doctoral degree must be fulfilled within 18 terms (6 years) of registration as a full-time or part-time doctoral student in accordance with FGS Registration Policies.

4.1.3 Modular Organization of Graduate-level Courses

Each one-term graduate course in Civil Engineering corresponds to 36 contact hours, to be delivered either in class or through electronic means (for example, using online teaching and learning technologies). Wherever possible, courses will be structured in a modular format, comprising at most three 12 hour modules of advancing degree of concentration or depth, referred to herein as L1, L2, L3 (L1=Foundation, L2=Intermediate, L3=Specialization), each level being prerequisite to the next. In accordance with the recent MIT Report[50], there are several benefits to be gained by the modular structuring and delivery of courses. A modular approach makes best use of the modern online lecture delivery capabilities. The updating/upgrading of a module is easier than redesigning the entire course. Furthermore, it gives the ability to students to retake any module with which they have had difficulties before moving to the next concept in a sequence.

Delivery of the course in a modular format may also facilitate alternative course scheduling, which may be desirable in certain cases (e.g. guest Lecturers from the Industry, Invited Experts in specific technologies), such as intensive two-day sessions that could be spaced apart throughout the academic term. Modular delivery of courses also provides flexibility to students who wish to pursue inter- and cross-disciplinary graduate studies

[47] http://gradstudies.yorku.ca/current-students/thesis-dissertation/oral-examination/ (accessed Oct 14, 2014).
[48] http://gradstudies.yorku.ca/current-students/thesis-dissertation/oral-examination/#section4d (accessed Oct 14, 2014).
[49] http://gradstudies.yorku.ca/current-students/regulations/degree-types/#doctoraltime (accessed Oct 14, 2014).
[50] MIT (2014). Ibid.

in the spirit of the Renaissance Engineer™ philosophy. Because lateral expansion of applied knowledge will take place at the L2 level (that is, once a foundation is established), it will be possible for courses to acquire several complementary L2-level modules that are limited in scope (12 hour contact time) but present important expansion to the basic course material. For example, a basic course in Earthquake Engineering would benefit from several alternative complementary modules (CM), such as for example, CM1: Engineering Seismology, CM2: Nonlinear Time History Analysis of Structures, CM3: Seismic Assessment of Existing Structures, CM4: Earthquake Response of Monuments, CM5: Base-Isolation of Structures and CM6: Control of Structures. A graduate student may choose to replace the L3 level of a non-core graduate course with an L2 complement.

According with the MIT report, the modular approach would make it easier for a team of professors to teach a course together, since faculty members could tackle a section rather than a whole course. Most importantly, in the context of the joint delivery of courses for the MEng, MASc and PhD programs, the modular scheme will make it possible for students to choose the modules so as to negotiate a greater breadth versus a greater depth in certain knowledge areas depending on their study interests and specialization profile. For organizational purposes, each course will be counted as three Credits towards the total number of credits required for completion of the program; in modular courses, each module will be associated with one Credit. Course requirements for the MASc degree correspond to a maximum of five L1 level modules. It is anticipated that PhD students will take mostly L2 and L3 level course modules.

4.2 Provide a list of courses that will be offered in support of the program. The list of courses must indicate the unit responsible for offering the course (including cross-lists and integrations, as appropriate), the course number, the credit value, the short course description, and whether or not it is an existing or new course. For existing courses, the frequency of offering should be noted. For new courses, full course proposals are required and should be included in the proposal as an appendix. (The list of courses may be organized to reflect the manner in which the courses count towards the program requirements, as appropriate; e.g. required versus optional; required from a list of specified courses; specific to certain concentrations, streams or fields within the program, etc.)

A complete list of all the graduate-level courses that will be offered by the Department of Civil Engineering is shown in Table 4.2.1. Brief outlines of all the courses listed in Table 4.2.1 are provided in Appendix C. The rubric GS/CIVL is used for all these courses. All the courses listed in Table 4.2.1 will be offered once every academic year. None of the courses listed in Table 4.2.1 are cross-listed or integrated with other courses. Coloured highlighting is used to group the courses that belong to each of the six sub-disciplines of Civil Engineering. These sub-disciplines are: Environmental, Geotechnical, Geoenvironmental, Structural, Transportation, and Water Resources. Please note that at the time of submitting this proposal, there have been no formal courses proposed in the Water Resources area because the Department currently does not have any faculty members working in this area. We intend to hire new faculty members in this area in the near future. As such, it is anticipated that there will be 3-4 formal courses in Water Resources area in the next two to three years. There are six 3-credit placeholders for Directed Reading courses in each of these six sub-disciplines (6100, 6200, 6300, 6400, 6500, and 6600).

While it may appear that the number of courses proposed is disproportionately large for a Department that currently has only 6 full-time faculty members, it should be noted that a staged approach of offering courses is proposed to ensure that each of the existing faculty members teaches no more than two graduate courses in the first year (2015-16) of the proposed graduate program. A total of eight 3-credit courses will be offered in Fall 2015 (6110, 6210, 6211, 6212, 6310, 6410, 6411 and 6510) in addition to the three non-credit courses (6000, 6001 and 6002). A total of nine 3-credit courses will be offered in Winter 2016 (6120, 6220, 6221, 6222, 6320, 6321, 6420, 6421 and 6520). All the remaining courses will be offered for the first time in the academic year 2016-17 (Fall 2016 and Winter 2017). Currently, there are three faculty positions open in the Department – one in Structural Engineering, one in Transportation Engineering, and one Alternate Stream (teaching focus) position, which are expected to be filled in by July 2015. As such, by the proposed start date of September 2015 for the graduate program, there will be a total of nine full-time faculty members in the Department. In addition, there are two adjunct professors in the Department who are also qualified and willing to teach graduate-level courses. The Department hopes to have several more adjunct professors appointed by September 2015. Therefore, by September 2015, there will be at least 11 instructors for a total of 17 graduate-level courses that the Department plans to offer in the 2015-16 academic year.

In addition to the proposed new courses, the Department has identified a number of existing graduate courses that are offered by other Departments and Faculties at York University, which could be of potential interest to MASc and PhD students in Civil Engineering; these courses are listed in Table 4.2.2. It is envisaged

that the availability of these courses outside of the Civil Engineering curriculum will give the students an opportunity to broaden their horizons, develop social conscience, entrepreneurial skills and a sense of global citizenship, which is very much in line with Lassonde School of Engineering's Renaissance Engineer™ philosophy. Another key attribute of the Renaissance Engineer™ is the ability to communicate effectively. This will be achieved through the students' mandatory participation in GS/CIVL 6000 Graduate Seminar Series in Civil Engineering. It is also worth pointing out that most graduate courses in Civil Engineering (as outlined in Table 4.2.1) have components that require students to present their coursework (e.g. term papers) in written form as well as orally. Additionally, the students will also be encouraged to attend regional, national and international conferences and workshops to present their research and to hone their communication skills further.

Table 4.2.1: List of graduate-level courses in Civil Engineering

Rubric	Code	Title	Area	PI	SI-1	SI-2	CU	Modular	Term	Year
GS/CIVL	6110	Physical Principles of Environmental Engineering	E	AE	MK	NH-E	3	Y	F	15/16
GS/CIVL	6120	Environmental Bioengineering Processes	E	AE	NH-E	NH-E	3	Y	W	15/16
GS/CIVL	6111	Advanced Laboratory Analytical Methods	E	AE	NH-E	MK	3	Y	F	16/17
GS/CIVL	6100	Special Topics in Environmental Engineering	E	NH-E	NH-E	AE	3	Y	F/W	16/17
GS/CIVL	6121	Air Pollution Engineering	E	NH-E	AE	NH-E	3	Y	W	16/17
GS/CIVL	6210	Advanced Soil Mechanics	G	JS	RyB	RaB	3	Y	F	15/16
GS/CIVL	6211	Geosynthetics	G	RyB	JS	NH-G	3	Y	F	15/16
GS/CIVL	6212	Unsaturated Soil Mechanics	G	RaB	MK	RyB	3	Y	F	15/16
GS/CIVL	6220	Advanced Foundation Design	G	CL	RaB	JS	3	Y	W	15/16
GS/CIVL	6221	Geotechnical Modelling	G	JS	RaB	RyB	3	Y	W	15/16
GS/CIVL	6222	Geohazards	G	RyB	JS	NH-G	3	Y	W	15/16
GS/CIVL	6213	Geotechnical Laboratory and Field Testing	G	RyB	JS	RaB	3	Y	F	16/17
GS/CIVL	6200	Special Topics in Geotechnical Engineering	G	NH-G	NH-G	JS	3	Y	F/W	16/17
GS/CIVL	6223	Ground Improvement Techniques	G	JS	CL	RyB	3	Y	W	16/17
GS/CIVL	6310	Advanced Hydrogeology	GE	MK	RaB	NH-GE	3	Y	F	15/16
GS/CIVL	6320	Flow and Transport in the Vadose Zone	GE	RaB	MK	NH-GE	3	Y	W	15/16
GS/CIVL	6321	Contaminant Hydrogeology	GE	MK	RaB	NH-GE	3	Y	W	15/16
GS/CIVL	6311	Site Remediation	GE	MK	RaB	NH-GE	3	Y	F	16/17
GS/CIVL	6300	Special Topics in Geoenvironmental Engineering	GE	NH-GE	NH-GE	MK	3	Y	F/W	16/17
GS/CIVL	6410	Advanced Reinforced Concrete	S	DP	NH-S	NH-S	3	Y	F	15/16
GS/CIVL	6411	Structural Dynamics and Earthquake Engineering	S	NH-S	DP	NH-S	3	Y	F	15/16
GS/CIVL	6420	Advanced Prestressed Concrete	S	NH-S	DP	NH-S	3	Y	W	15/16
GS/CIVL	6421	Introduction to Seismic Design of Reinforced Concrete Structures	S	DP	NH-S	NH-S	3	Y	W	15/16
GS/CIVL	6413	Advanced Structural Steel Design	S	NH-S	NH-S	DP	3	Y	F	16/17
GS/CIVL	6414	Bridge Engineering	S	NH-S	NH-S	DP	3	Y	F	16/17
GS/CIVL	6400	Special Topics in Structural Engineering	S	NH-S	NH-S	DP	3	Y	F/W	16/17
GS/CIVL	6422	Advanced Topics in Structural Engineering	S	NH-S	DP	NH-S	3	Y	W	16/17
GS/CIVL	6510	Advanced Transportation Engineering	T	SS	NH-T	NH-T	3	Y	F	15/16
GS/CIVL	6520	Pavement Materials, Analysis and Design	T	NH-T	NH-T	JS	3	Y	W	15/16
GS/CIVL	6511	Intelligent Transportation Systems	T	SS	NH-T	NH-T	3	Y	F	16/17
GS/CIVL	6500	Special Topics in Transportation Engineering	T	NH-T	NH-T	NH-T	3	Y	F/W	16/17
GS/CIVL	6521	Road Safety Engineering	T	NH-T	SS	NH-T	3	Y	W	16/17
GS/CIVL	6600	Special Topics in Water Resources Engineering	WR	NH-WR	NH-WR	NH-WR	3	Y	F/W	16/17
GS/CIVL	6000	Graduate Seminar Series in Civil Engineering	D				0		F	15/16
GS/CIVL	6001	PhD Thesis	D				0		F	15/16
GS/CIVL	6002	MASc Thesis	D				0		F	15/16

LEGEND:

Course Coding:
Environmental: 611X for Fall courses; 612X for Winter courses.
Geotechnical: 621X for Fall courses; 622X for Winter courses.
Geoenvironmental: 631X for Fall courses; 632X for Winter courses.
Structural: 641X for Fall Courses; 642X for Winter courses.
Transportation: 651X for Fall Courses; 652X for Winter courses.
Water Resource: 661X for Fall Courses; 662X for Winter courses.

E	Environmental
G	Geotechnical
GE	Geoenvironmental
S	Structural
T	Transportation
WR	Water Resources
D	Departmental
F	Fall Term
W	Winter Term
CU	Credit Units
PI	Principal Instructor
SI-1	First Backup Instructor
SI-2	Second Backup Instructor

Faculty:

AE	Ahmed Eldyasti
CL	Cao Laifa (Adjunct)
DP	Dan Palermo
MK	Magdalena Krol
JS	Jit Sharma
RaB	Rashid Bashir
RyB	Ryley Beddoe
SS	Sabbir Saiyed (Adjunct)
NH-E	New Hire - Environmental
NH-G	New Hire -Geotech
NH-GE	New Hire - Geoenvironmental
NH-S	New Hire - Structural
NH-T	New Hire - Transport
NH-WR	New Hire - Water Resources

[Note: (i) All the listed courses are new courses. (ii) Courses that are in a particular sub-discipline of Civil Engineering are considered core courses for that sub-discipline and courses from other sub-disciplines are considered technical electives for that sub-discipline.]

Table 4.2.2: List of courses outside of Civil Engineering available to Civil Engineering MASc and PhD students

Rubric	Code	Title	Faculty/Dept.
GS/ENVS	6124	Urban-Regional Planning	FES
GS/ENVS	6128	Transportation Planning	FES
GS/ENVS	6188	Remote Sensing and Image Processing	FES
GS/ENVS	6191	Management Practices for Sustainable Businesses	FES/Schulich
GS/ENVS	6164	Environmental Law	FES
GS/ENVS	5178	Environmental Policy	FES
GS/ENVS	5113	Business Strategies for Sustainability	FES/Schulich
GS/GEOG	5050	GIS and Spatial Analysis	Geography
GS/GEOG	5695	Fluvial Geomorphology	Geography
GS/GEOG	5602	Climatology of High Altitudes	Geography
GS/GEOG	5607	Ecological Climatology	Geography
GS/GEOG	5610	Biogeochemistry of Stream Ecosystems	Geography
GS/GEOG	5630	Physical Hydrology and Water Resources	Geography
GS/GEOG	5645	Dynamics of Snow and Ice	Geography
GS/MECH	6104	The FEM in Engineering Analysis	Mech Eng
GS/MECH	6102	Advanced Continuum Mechanics	Mech Eng
GS/MECH	6106	Advanced Engineering Mathematics	Mech Eng
GS/ESS	5180	Physical Principles of Remote Sensing	ESSE
GS/ESS	5400	GIS and Advanced Spatial Analysis	ESSE
GS/ESS	5410	Advanced Satellite Positioning	ESSE
GS/ESS	5420	Advanced Geospatial Information Technology	ESSE
GS/ESS	5430	Advanced Optimal Estimation Theory and Application	ESSE
GS/ENG	6001	Legal Aspects and Governance in Engineering	LSE
GS/ENG	6002	The Art and Science of Scholarly Writing	LSE
SB/ENTR	3400	Business Essentials for Technology Entrepreneurs I	Schulich
SB/ENTR	3600	Business Essentials for Technology Entrepreneurs II	Schulich
SB/ENTR	4500	Entrepreneurship and Technology Ventures	Schulich
GS/MATH	6602	Stochastic Processes	Math
GS/MATH	6605	Probability Theory	Math
GS/MATH	6630	Applied Statistics 1	Math
GS/MATH	6631	Applied Statistics 2	Math
GS/MATH	6635	Introduction to Bayesian Statistics	Math
GS/MATH	6652	Numerical Solutions to Differential Equations	Math

4.3 For undergraduate programs, comment on the anticipated class sizes. For graduate programs, comment on how the course offerings will ensure that each graduate student in the program will take a minimum of two-thirds of the course requirements from among graduate level courses.

All the courses offered by the Department of Civil Engineering (listed in Table 4.2.1) are graduate-level courses. A majority of the courses listed in Table 4.2.2 are either graduate-level courses or integrated courses. As such, it is quite straightforward to ensure that each graduate student in the proposed program takes a minimum of two-thirds of course requirements from among graduate-level courses.

4.4 As an appendix, provide a copy of the program requirements as they will appear in the Undergraduate Calendar or Graduate Calendar, as appropriate.

Brief course outlines for all the graduate-level courses in Civil Engineering (as listed in Table 4.2.1) are provided in Appendix C. Detailed course proposal for these courses are included in Appendix D.

5. Program Structure, Learning Outcomes and Assessment

The intent of this section is to provide reviewers with an understanding of the knowledge, methodologies, and skills students will have acquired by the time they complete the program (i.e. the program learning outcomes), including the appropriateness of the program learning outcomes and how they will be supported and demonstrated. With that in mind, and with explicit reference to the relevant degree level expectations, it would be useful to focus on what students in the program will know and/or be able to do by the end of a defined period of time and how that knowledge, methodology and/or skill will be supported and demonstrated.

5.1 Provide a detailed description of the program learning outcomes and indicate how the program learning outcomes are appropriate and align with the relevant degree level expectations.

The degree level expectations as articulated in the six criteria established by the Ontario Council of Academic Vice-Presidents (OCAV, Table 5.1.1 for the MASc and Table 5.1.2 for the PhD programs) form the benchmark reference for the development of the graduate program in Civil Engineering. The table identifies how these criteria are addressed in the proposed program.

Table 5.1.1: MASc Degree Level Expectations established by OCAV

CRITERION	MASc degree: EXPECTED PERFORMANCE OF GRADUATE This degree is awarded to students who have demonstrated the following:
1. Depth and breadth of knowledge	*A systematic understanding of knowledge, including, where appropriate, relevant knowledge outside the field and/or discipline, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study, or area of professional practice.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

The program aims for a strong technical foundation comprising a broad scope of technical courses including a number of core courses from the area of specialty, or major – the courses are delivered in a modular format to allow greater emphasis in areas of interest, but also to enable, through brief modules the fast updating of course material with state of the art information, and the versatile training in emerging technologies. The context of the program is at the center of current societal concerns regarding Ontario's ageing infrastructure, needs for sustainability and community resilience to disasters from extreme natural events. A particular objective of the program is to endow the student with technical competence in computational issues required in civil engineering in the areas of modeling and simulation of civil engineering works. A critical awareness of current problems and new insights is promoted through training in research (through a compulsory course on Research Methods that is intended to expose the students to critical assessment of the state of the art in their chosen discipline) before the student embarks on their MASc thesis research. The same objective is also supported by a comprehensive seminar series on all fields of new and emerging research and technology, but also on engineering ethics, economics and business issues related to the civil engineering profession. Professional judgment, cognizance of the field, and soft skills (oral/written) are targeted through several activities (the GSP, the Research Thesis presentation and Defense, and the participation to dissemination activities under the guidance of the supervisor). Interdisciplinary understanding is encouraged by the fact that the program's directions of emphases cut through the conventional fields of Civil Engineering as illustrated below:

Conventional Areas:
Structural Engineering
Geotechnical Engineering
Hydro-technical Engineering
Construction Management
Transportation Engineering
Environmental Engineering

Interdisciplinary Approach:
Infrastructure Management, Assessment & Maintenance
Resilience to Extreme Events
Sustainable development

CRITERION	MASc degree: EXPECTED PERFORMANCE OF GRADUATE This degree is awarded to students who have demonstrated the following:
2. Research and scholarship	*A conceptual understanding and methodological competence that* *a) Enables a working comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in the discipline;* *b) Enables a critical evaluation of current research and advanced research and scholarship in the discipline or area of professional competence; and* *c) Enables a treatment of complex issues and judgments based on established principles and techniques;*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

An appreciation of research as a means of knowledge generation and advancement is sought through several activities in the program – these include:

-A compulsory course on research methodology – with particular emphasis on the management of data (including statistical methods) (L2 Module), design of experiments and in the critical assessment of the state of the art (L3 Module).

-A leap in understanding the complexity of the field is attempted through the GSP (Graduate Studies Proposal) which is articulated individually by each student orienting their study-plan with reference to the context of the program in the directions of Infrastructure, Sustainability and Resilience under extreme events.

-Contribution in the area of knowledge creation or advancement through the research conducted for the MASc Thesis; work conducted is meant to train highly-qualified engineers in establishing and carrying out a research plan and in consistent interpretation of research findings.

2. Research and scholarship	*and, On the basis of that competence, has shown at least one of the following:* *a) The development and support of a sustained argument in written form; or* *b) Originality in the application of knowledge.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

Important actions are planned in the training program to enhance student capabilities to formulate and defend an argument, such as for example the delivery of the Thesis oral defense lecture in front of an audience of experts and in the graduate student workshop, as well as in the authorship of the GSP and the MASc thesis volume. Originality in the application of knowledge is promoted in the several projects conducted throughout the period of studies required by the graduate coursework.

3. Level of application of knowledge	*Competence in the research process by applying an existing body of knowledge in the critical analysis of a new question or of a specific problem or issue in a new setting.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

The student by conducting independent research and participating in all the creative activities associated with the thesis project with guidance resulting in the creation of know knowledge or the novel application of existing knowledge. The program is designed and structured so as to provide plenty of opportunities for the student to test their ability in applying the body of knowledge when dealing with an emerging new issue in Engineering. In fact, a significant fraction of the student engagement through projects (GSP, MASc Thesis), and seminars is intended to enhance the abilities and technical skills required to tackle difficult engineering problems over all the phases ranging from conceptual issues (ethical, fiscal and business considerations) to purely technical (e.g. computer aided simulation). This competence and overall understanding are expected to be further improved through participation of the students to the Departmental Seminar sessions as well as in the complementary courses offered by the Lassonde School on professional development.

CRITERION	MASc degree: EXPECTED PERFORMANCE OF GRADUATE This degree is awarded to students who have demonstrated the following:
4. Professional capacity/autonomy	*a) The qualities and transferable skills necessary for employment requiring:* *i) The exercise of initiative and of personal responsibility and accountability; and ii) Decision-making in complex situations;* *b) The intellectual independence required for continuing professional development;* *c) The ethical behavior consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research; and* *d) The ability to appreciate the broader implications of applying knowledge to particular contexts.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

Special emphasis is placed on the ethics in engineering and on professional competence in the form of the so-called soft skills (i.e. skills not strictly associated with engineering technical practice but however considered essential equipment for professional standing). Many of these skills are developed through practical implementation of the program requirements – for example, the blended learning approach which will be used in courses with a modular structure is designed to enhance intellectual independence for continuing professional development. The compulsory attendance of the seminar series which place emphasis on the emerging sciences and technologies and on Ethical and Business issues are intended to enhance the personal professional integrity of the individual and their sense of responsibility as professional engineers towards the society. The same is intended by the compulsory course on Engineering Ethics and one of the following two complementary courses offered for credit from the Lassonde School of Engineering:

(a) GS/ENG 6001 Legal Aspects and Governance in Engineering, (b) GS/ENTR 4500 Entrepreneurship and Technology Ventures

Also, the experience gained through TA-ing enhances the ability of the graduates to work in teams in a professional environment and to articulate concepts and ideas. The same is targeted for through the thesis research experience (planning and carrying out advanced level engineering work) and its defense to an expert audience. Major and minor emphases in two of the three emerging areas of Civil Engineering (Infrastructure-Resilience-Sustainability) require of the student through their GSP to position in this different framework the conventional, technical subdivision of knowledge.

5. Level of communications skills	*The ability to communicate ideas, issues and conclusions clearly.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

Communication skills are systematically cultivated in the program through several activities including written projects (authoring the Research Thesis, and the GSP), delivery of thesis defense lecture in audience, and through the L1 module of the course on Research Methodology.

6. Awareness of limits of knowledge	*Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

The students are encouraged to broaden their scope through the compulsory participation in Seminars presenting talks on emerging sciences and technologies. The interaction between the program emphases (Infrastructure, Resilience and Sustainability) becomes a focal point of reference for the students, in articulating through the GSP their own graduate studies profile. The modular format of the program, including many complementary L2 level modules enables speedy adjustment of the course material recognizing the evolution of the center of gravity of the state of the art. The graduate student has to complete their MASc thesis which, in the thesis defense, gives a clear definition of ones' own research contribution, limitations and future scope of the research study.

Table 5.1.2: PhD Degree Level Expectations established by the OCAV

CRITERION	PhD degree: EXPECTED PERFORMANCE OF GRADUATE This degree extends the skills associated with the Master's degree and is awarded to students who have demonstrated the following::
1. Depth and breadth of knowledge	*A thorough understanding of a substantial body of knowledge that is at the forefront of their academic discipline or area of professional practice including, where appropriate, relevant knowledge outside the field and/or discipline.*
PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION: The program builds on strong technical foundation of MASc graduates who continue on to obtain a doctorate. Breadth and depth of understanding and knowledge are assessed early in the degree program through the **comprehensive exam** of the student's technical competence and the background. Research capabilities, if they were not already assessed at the Master Degree level, will be demonstrated through a mandatory independent study project with the student's supervisor before he/she is finally admitted to the degree (advancement to candidacy). – Continuing on with the same mode of delivery as in the MASc degree, required courses are delivered in a modular format to allow greater emphasis in areas of interest; however at this stage of the candidate's training the emphasis is placed on the PhD Thesis research where the student demonstrates the depth and breadth of understanding by organizing and carrying out original work either on basic or on applied research, dealing with emerging or unsolved engineering challenges, in the general context of the graduate Civil Engineering program (infrastructure, needs for sustainability and community resilience to disasters from extreme natural events). A particular objective of the program is to endow the student with technical competence in simulation, either through experiment (Laboratory / Field Work) or through Computation – these attributes will be sought as assessment criteria of the research methodology pursued by the candidate, in the annual evaluation of the student's progress. Enhancing knowledge outside the field is cultivated through the compulsory attendance of graduate seminars on all fields of new and emerging research and technology, and three compulsory courses from the Lassonde School of Engineering, one being a non-credit course on Engineering Ethics and the other two being credit-based courses for professional development. Professional judgment, cognizance of the field, and soft skills (oral/written) are also targeted through the participation of the student in the delivery of the Undergraduate program in the role of Teaching Assistant as well as the required dissemination activities as pre-requisites to thesis submission. Student progress in evaluated on an annual basis, particularly with reference to dissemination of his/her research findings to international expert audiences.	
2. Research and scholarship	*a) The ability to conceptualize, design, and implement research for the generation of new knowledge, applications, or understanding at the forefront of the discipline, and to adjust the research design or methodology in the light of unforeseen problems;* *b) The ability to make informed judgments on complex issues in specialist fields, sometimes requiring new methods; and* *c) The ability to produce original research, or other advanced scholarship, of a quality to satisfy peer review, and to merit publication.*
PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION: The quintessence of this criterion is embedded in the preparation of the Doctoral Dissertation. Several actions are intended to bring out and cultivate such characteristics as would prepare the candidate in his role as a future expert researcher or principal-investigator in his/her subsequent career. Research as a means of knowledge generation and advancement is evaluated critically in every step of the thesis production, through (1) The Annual Progress Report submitted to the Faculty of Graduate Studies by the supervisory committee who evaluates the student's performance in developing and adhering to a research methodology and research plan, (2) The requirement that at least two journal papers drawn from the Thesis Research are authored and submitted for review by the time of graduation, (3) The requirement that the student has participated in conference presentations of research findings, (4) The final evaluation of the research work by committee of experts at final defense. The above chain of requirements is intended to consolidate informed critical judgment at the forefront of the chosen discipline and academic scholarship.	

CRITERION	PhD degree: EXPECTED PERFORMANCE OF GRADUATE This degree extends the skills associated with the Master's degree and is awarded to students who have demonstrated the following::
3. Level of application of knowledge	*The capacity to* *a) Undertake pure and/or applied research at an advanced level; and* *b) Contribute to the development of academic or professional skills, techniques, tools, practices, ideas, theories, approaches, and/or materials.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

The PhD thesis research is in line with this criterion, since the requirement for approval of the candidate's Research plan through the many evaluation steps outlined above are intended to secure the originality and innovation of the work. The thesis represents independent work conducted by the student that involves planning and solving of scientific problems to lead to the advancement of knowledge. Contribution to the state of the art will be certified not only by the members of the PhD Thesis Committee but through the interaction and peer evaluation received upon dissemination of the results to Journals and Conferences which are pre-requisite to conferring the degree. Furthermore, the student's engagement through the seminars series is intended to enhance the abilities and technical skills required to tackle difficult engineering problems over all the phases ranging from conceptual issues (ethical, fiscal and business considerations) to purely technical (e.g. computer aided simulation).

4. Professional capacity/autonomy	*a) The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex situations;* *b) The intellectual independence to be academically and professionally engaged and current;* *c) The ethical behavior consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research; and* *d) The ability to evaluate the broader implications of applying knowledge to particular contexts.*

PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION:

Special emphasis is placed on the ethics in engineering and on professional competence in the form of the so-called soft skills (i.e. skills not strictly associated with engineering technical practice but however considered essential equipment for professional standing). Many of these skills are developed through practical implementation of the program requirements – for example, the blended learning approach which will be used in courses with a modular structure is designed to enhance intellectual independence for continuing professional development. The compulsory attendance of the Engineering Ethics course (ENG6000) and the seminar series which place emphasis on the emerging sciences and technologies and on Ethical and Business issues are intended to enhance the personal professional integrity of the individual and their sense of responsibility as professional engineers towards the society. The responsibility placed by the supervisory committee on the student, in developing his/her research methodology and research plan, which is revisited on an annual basis, aims to enhance the ability for decision making in complex situations and the intellectual independence and autonomy commensurate to the professional qualification conferred with the Doctoral Degree. To this end, the doctoral student is expected to attend one of the following graduate courses offered by the Lassonde School, on professional development, which will be critical in strengthening the students' confidence in their appreciation of the economic climate and professional opportunities:

(a) LE/GS/MENG 6001 Legal Aspects and Governance in Engineering, (b) ENTR 4500 Entrepreneurship and Technology Ventures

Furthermore, teaching and Research Assistantships granted to the graduate students are also intended to benefit them by giving them intellectual responsibilities with professional-level expectations that go through procedures of formal evaluation.

Personal responsibility and accountability is cultivated through the requirements of annual meeting with the supervisory committee and submission of the Annual Activity Report that outlines progress made since the last meeting.

CRITERION	PhD degree: EXPECTED PERFORMANCE OF GRADUATE This degree extends the skills associated with the Master's degree and is awarded to students who have demonstrated the following::
5. Level of communications skills	*The ability to communicate complex and/or ambiguous ideas, issues and conclusions clearly and effectively.*
PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION: Communication skills are systematically cultivated in the program through several activities including written projects (Dissertation Volume, papers), participation of dissemination activities with presentations to expert audiences, and through the L1 module of the course on Research Methodology. TA duties in the undergraduate program, which are subject to anonymous evaluation by the students, have an important contribution towards the doctoral candidate's training in communication of complex concepts.	
6. Awareness of limits of knowledge	*An appreciation of the limitations of one's own work and discipline, of the complexity of knowledge, and of the potential contributions of other interpretations, methods, and disciplines.*
PROGRAM ATTRIBUTE TOWARDS ACHIEVING THE CRITERION: The students are encouraged to broaden their scope through the compulsory participation in Seminars presenting emerging sciences and technologies. The interaction between the program emphases (Infrastructure, Resilience and Sustainability) becomes a central point of reference in formulating the scope of research conducted in the department by its doctoral students. The modular format of the program, including many complementary L2 level modules enables speedy adjustment of the course material recognizing the evolution of the center of gravity of the state of the art. A most important contribution towards realization of one's own limits is the participation of the student in national and international conferences with presentations of research findings. The graduate student has to complete their PhD Dissertation which gives a clear definition of ones' own research contribution, limitations and future scope of the research study.	

5.2 Address how the program curriculum and structure supports achievement of the program learning outcomes. For research-focused graduate programs, comment on the nature and suitability of the major research requirement(s) for degree completion. For undergraduate programs, comment on the nature and suitability of students' final-year academic achievement in the program.

The basic components of the curriculum outlined in Table 4.1.1, have been discussed in detail with reference to the learning outcomes according with the established criteria set by the OACV, in the corresponding cells of Table 5.1.1 and 5.1.1. The graduate program is focused in research, combining a moderate emphasis in advanced level coursework intended to endow the students with the technical skills beyond what they obtained during their undergraduate study, so as to be competent in the application of advanced methods and techniques from the body of knowledge; complementary training in the form of credit and non-credit activities are included in order to provide the students with additional capabilities in the areas of professional development including communication, ethics, business, and the legal framework of engineering operation.

The primary achievement of the student is production and defense of a Research Thesis in an original area of study with documented contribution to the state of the art and in creation of new knowledge, to an extent and intensity that is commensurate to the degree level. Each graduate student is supervised by a departmental faculty member and is engaged in research immediately upon joining the program. The research progress and output are monitored and evaluated by a supervisory committee appointed according with the procedures set by the Faculty of Graduate Studies. The program is structured by design to achieve the research objectives listed in Tables 5.1.1 and 5.1.2, through a multi-stage assessment procedure of the research conducted; however attainment of the learning objectives takes advantage of the relevant course based activities (e.g. compulsory participation in the department's seminar series). By systematically engaging the graduate student to activities of communication of their research findings, either to the supervisory committees, the thesis defense, seminar participation, and dissemination of findings in national and international forums, the program intends to instill the students with professional attitude towards their work, their peers, and their discipline in general.

5.3 Address how the methods and criteria for assessing student achievement are appropriate and effective relative to the program learning outcomes and Degree Level Expectations.

Student's performance will be evaluated using a range of assessment tools that refer both to performance in courses taken and progress in research. Thus in courses that are organized in modules, the student will be evaluated upon completion of each module. Tests and quizzes, assignments and exams will be used in courses of a generic content. Multidisciplinary or advanced design courses will be graded based on project work, field work, experimental work, and oral/written presentations against the learning targets listed in Tables 5.1.1 and 5.1.2.

Defense of graduate thesis will be evaluated by an examination committee appointed as per the FGS regulations. Written Reports and oral presentations will be marked using the following rubric: 15% for quality of presentation material and delivery, 25% for critical assessment of the state of the art, 25% for completeness of work, and 40% for quality of work conducted (content). The above methods are intended to highlight a range of the students' capabilities as described in detail in the following table:

Criterion	Evaluation Method	Evaluation Scheme
1. Depth and breadth of knowledge	Exams, Tests, Quizzes Assignments, Written Reports & Projects	≥ *60% of course mark* ≤ *40% of course mark*
2. Research and scholarship 3. Level of application of knowledge 6. Awareness of limits of knowledge	Written Reports & Oral presentations	10-20% for quality of presentation material, 20-25% for critical assessment of the state of the art 20-30% for completeness of work, 40-50% for content
4. Professional capacity/ autonomy 5. Level of communications skills	Research Plans and Methodology Research Report & Projects (individual)	10-20% for quality of presentation material and delivery, 20-30% for completeness of work, 20-30% for Innovative Aspects, 40-50% for content

With regards to each of the learning objectives detailed in the preceding, student assessment criteria and methods, and their alignment with GDLEs of the MASc and PhD programs are detailed in the Tables 5.3.1 and 5.3.2 (on the next two pages).

Table 5.3.1: Methods and Criteria for the Assessment of MASc Degree Level Expectations (DLEs)

DLE	Assessment Methods and Criteria
1- Depth and Breadth of Knowledge	It is expected that every MASc student will: - Successfully defend their MASc thesis in an examination session following the guidelines specified by the Faculty of Graduate Studies at York University. - Obtain a minimum grade of B- in the required coursework. - Submit Annual Progress Reports (APRs) and demonstrate satisfactory progress in research project between two successive APRs. - Deliver at least one presentation at the Department's Annual Graduate Symposium. - Attend 10 departmental seminars to receive a pass grade in the non-credit Graduate Seminar course.
2- Research and Scholarship	- Research progress is mainly assessed by the supervisor on the basis of one-to-one or group meetings. - The MASc thesis will be evaluated by a committee with domain knowledge expertise and one graduate faculty member at arm's length from the dissertation, usually from outside the Department. - Students must successfully defend their thesis in Oral Examination which also will be assessed by the examination committee following FGS guidelines - Attend 10 departmental seminars to receive a pass grade.
3- Level of Application of Knowledge	- Participate under guidance to dissemination of research results – activity reflected in the Annual Progress Report (APR) and evaluated. - Level of application of knowledge is assessed by the supervisor and the consideration of the student performance in his/her coursework.
4- Professional Capacity / Autonomy	- Students are expected to receive a pass grade on a mandatory Engineering Ethics course. - Students are expected to pass all the credit course requirements - Students should be able to create design solutions and/or develop research programs that take ethical, social, environmental, legal, and regulatory influences into account
5- Level of Communication Skills	- Presentation skills will be evaluated during the Departmental Workshop event by two faculty members as session referees, and fellow graduate students. Evaluations will be used to determine for selection of the best presenter - Students' Activity Reports will be assessed by the supervisor and members of the Graduate Studies Committee on a yearly basis. - These will be evaluated by examination committees following instructions provided by FGS
6- Awareness of Limits of Knowledge	- Students are expected to include a section in their theses to discuss the limitations and future directions of the conducted research.

Table 5.3.2: Methods and Criteria for Assessment of PhD Degree Level Expectations (DLEs)

DLE	Student Assessment Methods and Criteria
1- Depth and Breadth of Knowledge	In the PhD thesis the candidate is expected to critically assess a complex problem with opposing and conflicting positions, systematically review, analyze, assimilate and interpret a body of scientific literature and innovations in a number of fields outside ones area of research but pertinent to the research being undertaken, and identify gaps in the literature and opportunities for new research to address shortcomings in the field. Assessment of performance: It is expected that every Ph.D. student will: - Pass the Ph.D. Comprehensive examination within 12 months of starting the program. - Present and successfully defend PhD Research Proposal within 24 months of starting the program. - Successfully defend the student's PhD thesis in an examination session according with the guidelines provided by the Faculty of Graduate Studies at York University. - Obtain a minimum grade of B- in the required coursework. - Submit Annual Progress Reports (APRs) and demonstrate satisfactory progress in research project between two successive APRs. - Deliver at least two presentations during the course of the PhD program at the Department's Annual Graduate Symposium. - Attend 10 departmental seminars to receive a pass grade in the non-credit Graduate Seminar course.
2- Research and Scholarship	The PhD student is expected to identify under the guidance of their supervisor, novel and significant open research questions, develop a research methodology to address the issues in hand, to adjust the methodology to the limitations of the available resources, to articulate the expected outcomes and how this will lead to the advancement of knowledge, address risks to the successful outcome of the research, critically assess the literature and eventually support all these choices in the thesis defense. Assessment of performance: Expose the research progress in regular frequent one-to-one meetings with the supervisor, submit APRs to the supervisory committee, taking part in meetings to discuss and present research results. -The PhD thesis will be evaluated by a committee of experts according with the regulations of the Faculty of Graduate Studies. Oral defense is part of the evaluation requirements. -The student will successfully complete the Graduate Seminar Series course
3- Level of Application of Knowledge	In conducting the PhD research the student will implement research experimentation independently, conduct independent research appreciating limitations of one's knowledge and seeking support and advice when warranted, keep track of new simulation methods and design novel experimental setups as required by carrying out their study, participate in dissemination of knowledge. Assessment of performance: - Dissemination efforts are recorded in APRs and are used by the supervisory committee for student evaluation. - Research plans are discussed in detail and evaluated by the supervisory committee - Successful passing of comprehensive examination within 12 to 18 months of the program.
4- Professional Capacity / Autonomy	The PhD students are responsible for their research, and have greater autonomy in adjusting their own rate of progress. Assessment of performance: - The students' individual progress towards meeting program requirements and timelines is assessed by the supervisory committee reviewing the APRs; - Students are expected to receive a pass grade on a mandatory Engineering Ethics course. - Students are expected to pass all the credit course requirements - Students should be able to: evaluate how ethical, social, environmental and legal issues may affect the students' research; and, analyze critical issues within their research areas and broadly-related fields
5- Level of Communication Skills	The PhD student is expected to present material in a coherent and organized form in a public setting, using appropriate media, and communicate effectively, receiving feedback, addressing different methodological opinions and questions. To also present research findings in national or international conferences, and to give a seminar in the Departmental Graduate Seminar Series. Assessment methods: - Students' APRs will be assessed by the supervisory committee on an annual basis. - PhD Thesis will be evaluated by the examination committee according with the regulations of the Faculty of Graduate Studies.
6- Awareness of Limits of Knowledge	- Within the framework of their research work the doctoral students will identify the implications of the work in the multidisciplinary fields that form the thematic areas of the department and will explain how advancement of knowledge in this interdisciplinary context is advanced by their research. - Students are expected to include a section in their theses to discuss the limitations and future directions of the conducted research.

5.4 For graduate programs, indicate the normal full-time program length (i.e. the length of time in terms in which full-time students are expected to complete the program) including a description of how students' time-to-completion will be supported and managed to ensure that the program requirements can be reasonably completed within the proposed time period. Indicate if the program will be available on a part-time basis, and, if applicable, explain how students' time-to-completion will be supported and managed to ensure that the program requirements can be reasonably completed on a part-time basis.

The normal expected degree completion time for MASc students is 24 months (6 terms) on a full-time enrolment basis. Similarly, for full-time PhD students the normal expected degree completion time is 48 months (12 terms). All requirements for a Master's degree must be completed within 48 months (12 terms) of registration as a full-time or a part-time student, including the requirement of continuous registration.[51] All requirements for a PhD degree must be completed within 6 years (18 terms) of registration as a full-time or a part-time student, including the requirement of continuous registration.[52] The degree completion time is monitored by the Graduate Program Director (GPD), who, in consultation with the student's supervisor(s) and the members of the student's supervisory committee, reviews the student's yearly progress on the basis of the Annual Progress Reports (APRs) submitted by the student and the student's supervisor(s). The purpose of this review is to ensure that the student's workload in terms of courses, research project, teaching assistant duties, etc. is kept to reasonable levels to enable the student to complete the degree requirements within the maximum permitted time limit. The GPD also sets program deadlines for group events, such as presentations at the Annual Graduate Symposium, comprehensive examination, research proposal presentation and defense, etc. and coordinates the student's requests for changes in the student's plan of studies. Exceptional circumstances, such as leaves of absence, maternity leave, parental leave, etc. are accommodated as per the FGS regulations and do not count towards maximum time limits.

5.5 Describe the proposed mode(s) of delivery, including how it/they are appropriate to and effective in supporting the program learning outcomes.

The program relies on blended learning methods in order to instill to the students a culture of independence in learning, in conducting autonomous work, and self-reliance in finding solutions to emerging problems, so as to prepare them for a life-long learning experience. One such example is the flipped classroom approach where students engage in self-directed learning outside the classroom whereas contact hours are used for in-class discussions of the course material with the Instructor. An electronic repository system supporting the emerging learning approaches that depend on online technologies will be the backbone of graduate classes, particularly those classes that are delivered in modular fashion. Several of the program activities include components such as formal report writing and oral presentation to peers, which are expected to provide additional communication skills. All students are required to attend a course on Engineering Ethics offered by the Lassonde School of Engineering, where, through the interaction with peers from other fields of engineering, students will benefit by realizing the breadth of engineering as a field of activity. Experiential learning such as experimental or field testing, development of experimental setups in the lab facilities, and use of computer simulation methods, as well as participation in the Graduate Seminar series of the department and in conferences are intended to enhance the ability for application of knowledge and skills to original problems of Civil Engineering by the force of example (observing others present creative approaches to problem solving).

[51] http://gradstudies.yorku.ca/current-students/regulations/degree-types/#masterstime (accessed Oct 15, 2014)
[52] http://gradstudies.yorku.ca/current-students/regulations/degree-types/#doctoraltime (accessed Oct 15, 2014)

6. Admission Requirements

6.1 Describe the program admission requirements, including how these requirements are appropriately aligned with the program learning outcomes.

Minimum Requirements for Admission to MASc Degree Program in Civil Engineering

- A bachelor's degree (BASc, BEng or equivalent) in Civil Engineering (or a closely-related discipline)
- Minimum B average in the final two years of the bachelor's degree program

Minimum Requirements for Admission to PhD Degree Program in Civil Engineering

- A bachelor's (BASc, BEng or equivalent) and a master's (MASc, MEng or equivalent) degree in Civil Engineering (or a closely-related discipline)
- Minimum B average in the coursework for the master's degree

Minimum Requirements for Transfer from MASc to PhD Degree Program in Civil Engineering

[Case #3 as outlined in Section 4.1.2]

- Successful completion of MASc course requirements as outlined in Section 4.1.2
- Overall A average in the MASc coursework
- Submission of a research plan to the supervisory committee and its approval by the supervisory committee in consultation with the Graduate Programs Director (GPD)

Application Package

- A completed prescribed application form.
- Course transcripts* for bachelor's degree (for admission to MASc program)
- Course transcripts* for bachelor's and master's degrees (for admission to PhD program)
- A cover letter elaborating the applicant's professional goals and motivation for graduate studies
- Curriculum vitae of the applicant
- Two confidential letters of recommendation
- Proof of English language proficiency (for international applicants; as per FGS regulations[53]). For applicants who have not completed four full years of studies at the secondary-school level or university level in a country where English is a primary language or where English is the primary language of instruction, they must demonstrate their language proficiency in English. Accepted tests include TOEFL, IELTS, YELT and others. Detailed scores can be found here: http://futurestudents.yorku.ca/requirements/language_tests.

[* The applicants must arrange for the official transcripts to be sent directly to York University Graduate Admissions from the universities where they completed their degrees.]

Academic credentials of international applicants will be evaluated for equivalency as per the FGS regulations and guidelines.[54] The requirements for admission are intended to screen out candidates that do not have the orientation and background required to meet the demands of the graduate program. It is noted here that studies in Civil Engineering as described in Section 4 are primarily of technical nature. As such, students must demonstrate good grasp of fundamental engineering sciences and mathematics. Also, given the emphasis on complementary education and the goal of producing engineers with all-round technical and communication skills and awareness of societal and environmental issues, the ability to articulate in English verbally and in writing is required for all students admitted to the proposed graduate programs. Therefore, the overall admission requirements for the graduate programs are appropriately aligned with the programs' learning outcomes.

6.2 Explain any alternative requirements, if any, for admission into an undergraduate, graduate or second-entry program, such as minimum grade point average, additional languages or portfolios, along with how the program recognizes prior work or learning experience.

Not Applicable.

[53] http://gradstudies.yorku.ca/prospective-students/international-students/elp/ (accessed Oct 15, 2014)
[54] http://futurestudents.yorku.ca/graduate/equivalency (accessed Oct 15, 2014)

7. Resources

7.1 Comment on the areas of strength and expertise of the faculty who will actively participate in delivering the program, focusing on its current status, as well as any plans in place to provide the resources necessary to implement and/or sustain the program.

The Department of Civil Engineering at York University was established in May 1, 2013 as one of the major building blocks of the Lassonde School of Engineering (LSE). Since January 2013, six faculty members (one Professor who also serves as the Department Chair, two Associate Professors and three Assistant Professors) have been hired as projected in the Lassonde School's strategic planning document. Hiring of three more faculty members (two professorial stream positions and one alternate stream position) in year 2015 has been approved by the Senate; these positions have been advertised widely and are currently open. The hiring process at the Department of Civil Engineering will continue gradually over the next several years aiming towards full projected capacity of 23 faculty members by 2021.

The undergraduate program in Civil Engineering at the Lassonde School of Engineering (LSE) was approved by the Ontario Universities Council on Quality Assurance in August 2013 and the first class of students was admitted in September 2014. The number of applications received for 2014 admission in Civil Engineering and the other sister engineering programs at LSE has been overwhelming (several hundred applications for the 50 positions). It is anticipated that the interest for the undergraduate program and the effectiveness of its educational mandate will be significantly enhanced and positively influenced by the introduction of the graduate program. The Master's degree programs (MEng, MASc) have a great appeal to aspiring undergraduates, as they give them a perspective for their field of study, and appreciation of the technical demands of becoming a professional engineer. The mere presence of the post-graduate students excites their ambition to perform so as to meet the entrance requirements whereas, presentations of ongoing research and other activities (for example, student workshops, lab experiments, summer lab assistantships, etc.) add to their experiential learning while in the undergraduate program. It has already been stated that the much needed contribution of graduate students as Teaching Assistants and assignment graders is very important also for the function of the undergraduate program. For the above reasons introduction of the graduate program in Civil at this point in time to complement the undergraduate program and to provide a liaison between teaching and research is deemed a strategic step towards fulfillment of the Civil Engineering research and teaching objectives.

The Lassonde School of Engineering has established highly competitive and aggressive start-up funds for all newly hired faculty members so as to enable them to establish their research facilities and research teams (recruiting of outstanding graduate students). For now, the department faculty offices are temporarily located in Chemistry Building; however, the new laboratory facilities are currently being under construction and are expected to be fully functional in the fall of 2015. Faculty members combine expertise in several of the core areas of Civil Engineering, with emphasis on structural engineering, structural mechanics and concrete technology (Dan Palermo), soil mechanics and geotechnical engineering (Jit Sharma; Rashid Bashir; Ryley Beddoe), environmental engineering (Magdalena Krol, Ahmed Eldyasti), geoenvironmental engineering (Rashid Bashir, Magdalena Krol), solid waste management (Rashid Bashir; Jit Sharma), bio- and geothermal energy systems (Magdalena Krol, Ahmed Eldyasti), and contaminant transport and site remediation (Magdalena Krol). The Department has also been successful in appointing two experienced civil engineers – Sabbir Saiyed, who holds a PhD in transportation engineering, and Laifa Cao, who holds a PhD in geotechnical engineering, as Adjunct Professors.

While it may appear that the number of courses proposed is disproportionately large for a Department that currently has only 6 full-time faculty members, it should be noted that a staged approach of offering courses is proposed to ensure that each of the existing faculty members teaches no more than two graduate courses in the first year (2015-16) of the proposed graduate program. A total of eight 3-credit courses will be offered in Fall 2015 (6110, 6210, 6211, 6212, 6310, 6410, 6411 and 6510) in addition to the three non-credit courses (6000, 6001 and 6002). A total of nine 3-credit courses will be offered in Winter 2016 (6120, 6220, 6221, 6222, 6320, 6321, 6420, 6421 and 6520). All the remaining courses will be offered for the first time in the academic year 2016-17 (Fall 2016 and Winter 2017). As mentioned above, there are three faculty positions open in the Department – one in Structural Engineering, one in Transportation Engineering, and one Alternate Stream (teaching focus) position, which are expected to be filled in by July 2015. As such, by the proposed start date of September 2015 for the graduate program, there will be a total of nine full-time faculty members in

the Department. In addition, the two adjunct professors in the Department are also qualified and willing to teach graduate-level courses. The Department hopes to have several more adjunct professors appointed by September 2015. Therefore, by September 2015, there will be at least 11 instructors for a total of 17 graduate-level courses that the Department plans to offer in the 2015-16 academic year.

Office and laboratory spaces will be allocated for the existing and incoming full-time faculty members in the new engineering building (named Bergeron Centre for Engineering Excellence, which is currently under construction on York University's Keele Campus). Thus, by the time the undergraduate students reach Year 2 of their program, it is expected that the Department will have all the necessary resources to respond to the teaching load and to establish a fully operational graduate program from Fall 2015 when the first cohort of graduate students will formally enter the Civil Engineering graduate degree programs.

7.2 Comment on the anticipated role of retired faculty and contract instructors in the delivery of the program, as appropriate.

Given that the Department of Civil Engineering is just one-year old, there are no retired faculty members in it. At this point, there are no plans to hire contract instructors to deliver graduate-level courses. The Department does have plans to ask the adjunct faculty members to teach graduate-level courses. For example, GS/CIVL 6510 Advanced Transportation Engineering, which is being offered in Fall 2015, will most likely be taught by adjunct professor Sabbir Saiyed and GS/CIVL 6220 Advanced Foundation Design, which is being offered in Winter 2016, will most likely be taught by adjunct professor Laifa Cao.

7.3 As appropriate, identify major laboratory facilities/equipment that will be available for use by undergraduate and/or graduate students and to support faculty research, recent acquisitions, and commitments/plans (if any) for the next five years.

Because Civil Engineering laboratory work concerns modeling of the natural environment to a relatively large scale (1:2 to 1:10 scales are common) the magnitude of forces that need to be applied and resisted during tests are very high, requiring special force-generating systems to apply loads and reacting systems of commensurate capacity to support these forces. For this reason, large-scale multi-million dollar testing facilities and equipment are necessary before the laboratories may be considered complete. It is therefore necessary for the delivery of the program that the most demanding components of the laboratories - currently under construction - be operational in 2015 – this is part of the Lassonde School's ongoing project for the construction of a brand-new purpose-built 167,500 ft^2 Bergeron Centre for Engineering Excellence that is expected to be ready by September 2015. This new building includes a 350 m^2 10-m-high Heavy Structures Lab, which includes state-of-art structural testing equipment such as an L-shaped 6-m-high reaction wall and strong floor, large capacity hydraulic actuators and hydraulic pumps, servo-controlled systems and several smaller testing frames. All specialized facilities required by the Civil Engineering program (e.g., undergraduate laboratories, computer lab, project area, workshop, etc.) will be fully operational in the new engineering building (including a concrete-mixing lab, a wood-working lab and a clean room for instrumentation). Teaching laboratories include a 108 m^2 Materials Testing Lab, and Environmental Engineering Lab (108 m^2) and Geotechnical Engineering Lab (108 m^2). Other laboratories under the jurisdiction of Department of Civil Engineering are: Transportation and Construction Materials Research Lab (115 m^2), Geotechnical Engineering Research lab (100 m^2), Environmental Engineering Research Lab (108 m^2), and Computer Modeling Lab (54 m^2). The Fluid Mechanics and Hydraulics Teaching Lab will be shared between the Department of Civil Engineering and the Department of Mechanical Engineering. It is anticipated that the second Engineering Building, which is at a conceptual planning stage at the moment, will house a state-of-the-art Water Resources Engineering Research Lab.

Existing equipment and facilities at the Department of Earth and Space Science and Engineering (ESSE) will also be used for Lidar-based research in monitoring of structures and infrastructure. In light of the ongoing acquisition of all these state-of-the-art equipment, there is great motivation among the faculty members to get their laboratories up and running as this will provide a great foundation for solicitation of competitive research funding for unprecedented experimental and field work. With the continued hiring of new faculty members over the next few years and additional funding in the form of the new member's start-up funds, further expansion of investment in the lab is envisioned. Synergistic effects are anticipated by the focus for procurement of funding through national programs, such as NSERC/RTI, CFI/JELF and major CFI, which is a high academic priority by all faculty members, including collaboration with the Mechanical Engineering faculty over the shared facilities. With completion of the construction of facilities that is currently under way, the Civil Engineering Department at

York is expected to be positioned among the most modern equipped civil engineering faculties in Ontario with consequent implications and impact on the professor's ability to conduct innovative research experiments.

Specialized equipment to support teaching and online learning and course material repositories are already being developed for the needs of the undergraduate program – these will be used in the proposed graduate program also. In addition to laboratory equipment, four main categories of software, that is computer-aided drawing and design (CADD), simulation and modeling, data acquisition and analysis, and office and teamwork productivity, will be installed in the laboratories and maintained by the information technology (IT) personnel of the Lassonde School of Engineering. Licenses for specialized software (ANSYS, ABAQUS, Labview, MATLAB, GeoStudio, Hydrus, etc.) are either currently available or will be acquired before September 2015 to support the Department's teaching and research endeavours.

7.4 As appropriate, provide information on the office, laboratory and general research space available that will be available for faculty, undergraduate and/or graduate students; the availability of common rooms for faculty and graduate students; administrative space; as well as any commitments/plans (if any) for the next five years.

As already stated in Section 7.3, the new Bergeron Centre for Engineering Excellence, which will be ready by September 2015, will have all the necessary teaching and laboratory space required by the proposed Civil Engineering graduate programs. The new building will also have a number of meeting rooms and project spaces where out-of-class learning can take place. Such spaces are complemented by a number of social learning spaces where students can interact with each other or with faculty and staff. The new engineering building will also house the Lassonde School of Engineering's Student Service Centre, which is being designed as a "one-stop shop" for all things important to undergraduate and graduate students. Technical support staff will have offices next to the laboratories or workshop areas for immediate access and supervision of the students. The entire 2nd floor will be dedicated to the Civil Engineering faculty and graduate research laboratories. The new building also features spaces for meetings and flipped classroom activities to facilitate out-of-class learning. Additionally, several social learning spaces for student and faculty interaction will be available in the new building.

For the period up to the completion of the new building, the offices of the faculty members will be temporarily housed in the Chemistry Building. According to University's Campus Services and Business Operations (CSBO), a sufficient number of lecture halls are available for use by the Department until completion of the new building.

7.5 As appropriate, comment on academic supports and services, including information technology, that directly contribute to the academic quality of the program proposed.

The success of the program will depend on the availability of necessary administrative, logistical, technical and computational (IT) support. The plans to fulfill these requirements are discussed in the following sections. A faculty member at the department who will be appointed as the Graduate Program Director (GPD) will be responsible for the administration of these activities. As such, he/she should be provided with appropriate teaching relief as per York University Faculty Association (YUFA) Collective Agreement.

Information Technology (IT): Support for IT at the department will be mainly provided from the Faculty as per our current agreement in-place with LSE. A number of major software tools for CAD (e.g. Autocad), Data Acquisition (e.g. LabVIEW), Simulation (e.g. MATLAB) and Office and Teamwork Productivity have already been identified by the current faculty members and the required number of licenses have been communicated with IT staff at LSE. Any specialized software (used by only a single research group) is expected to be purchased and maintained by individual faculty members at the department (e.g. ANSYS, ABAQUS, FLUENT, etc.).

Technical support: Operation of the laboratories will require at least three technical support staff positions – that is, a Lab Manager, an Electrical Engineering Technologist with expertise in servo-hydraulic control systems and Instrumentation, and a Mechanical Engineering Technologist to operate the workshop. The Mechanical Engineering Technologist will be partially responsible for helping faculty members and their graduate students to setup their laboratories, equipment and major experimental setups while also running the machine shop and fabrication facilities and maintaining the undergraduate laboratories of the department. The Electrical Engineering Technologist will assist the faculty members and graduate students with their

software and computer hardware inquiries and will be responsible for the smooth operation of all the computing facilities used for teaching.

Office support: The Departmental Graduate Studies Committee comprising the Graduate Program Director (GPD) and two other faculty members representing the three directions of the graduate program (Infrastructure, Resilience and Sustainability) will oversee progress of the graduate students and will supervise/organize all activities related to smooth running of the program. The Department will also hire a Graduate Program Assistant (GPA) in 2015, who will organize and assume responsibility for routine financial and administrative activities of the graduate program including but not limited to payroll and grant submissions, hiring expenses, submission of all FGS documents related to theses and dissertations, graduate student funding, graduate student scholarships and awards.

Resources: Access to international and national electronic scientific databases is of paramount importance in order to secure the essential conditions for the scientific relevance of research conducted by faculty and the graduate students in their various projects. York University is very advanced in this aspect. Civil Engineering students have access to a host of core textbooks at the Steacie Science and Engineering Library. The library also provides students with access to database resources such as Web of Science, Knovel and Engineering Village where students can conduct searches on state of the art developments in Civil Engineering. In the first couple of years the faculty members will collaborate with staff in the Steacie Science and Engineering Library to establish access and registration to literature collections in specialty fields if they are not already included in the centrally managed databases.

Other Research Equipment: Apart from the stationary facilities which are part of the engineering building (strong floor and strong walls) additional equipment such as universal testing frames for material characterization, permeability / mercury porosimetry devices, cameras for imaging, laser-scanning, microscopy facilities (such as access to electron scanning microscopy), ion-chromatography, laser–particle velocimetry (for fluid mechanics), open channel simulators, fluid reactors, special devices for geotechnical material characterization, access to meteorological data will be needed by the various faculty groups within civil engineering and by their graduate students for their specific research and teaching needs. Many of these pieces of equipment have already been planned to be available and operational in the new engineering building, the Bergeron Centre for Engineering Excellence – whereas additional equipment will be acquired with startup investment with the arrival of new faculty.

7.6 For graduate programs, indicate financial support that will be provided to master's and/or PhD students, including how this support will be sufficient to ensure adequate quality and numbers of students. Comment on how supervisory loads will be distributed, as appropriate. Special attention should be paid to supervisory capacity for new PhD programs.

The success of graduate students epitomizes a Department's standing at the national and international level: Research conducted in partial fulfillment of the graduate degree requirements help to materialize the innovative ideas of the principal investigator (the supervising professor), by converting concepts to actual findings. In this way graduate student research leverages the department's research output. The proposed research-based graduate program in Civil Engineering reflects the faculty's commitment for excellence in teaching and research. Graduate research assistants who work towards their MASc or PhD degrees can expect financial support on an annual basis, comprising a combination of Scholarships, Research, Teaching and Graduate Assistantships, for up to two years for the MASc degree and up to four years for the PhD degree. Table 7.6.1 outlines the breakdown of financial support envisioned for the four different categories of graduate students in the program (that is, domestic MASc, international MASc, domestic PhD, and international PhD), and the net amounts of financial support available after deduction of the tuition fees.

All graduate programs within the Lassonde School of Engineering (LSE) operate under a hybrid activity-based budget (ABB) model, known as SHARP, according to which all revenues from tuition, government grants, contract overheads and indirect cost of research are directed from York central administration to the LSE and subsequently to the departments and researchers. Therefore, the LSE has the full responsibility to administer the graduate funds to strengthen and intensify research as well as invest in people and new initiatives. As such, the LSE is in a strong position to offer very competitive funding packages to graduate students in a sustainable manner. Table 7.6.1 provides general funding level guidelines (minimum guarantee) for all new students admitted to the graduate programs at LSE. Continuing students admitted to the LSE's

graduate programs prior to May 1, 2014 are funded based on the old funding model as administered by the Faculty of Graduate Studies.

The funding packages outlined in Table 7.6.1 are very competitive when compared to the standard funding packages available to graduate students at other universities in the GTA. Such competitive funding packages, when considered in combination with other significant factors, such as state-of-the-art facilities and a dynamic group of early- to mid-career faculty members who are eager to establish themselves as the nation's leading researchers in the key areas of **Infrastructure**, **Resilience** and **Sustainability**, will ensure that the proposed graduate program will attract top-quality graduate students both in the short and the long term.

Table 7.6.1: Yearly Recommended Financial Support for MASc and PhD Students

Source	MASc Domestic	MASc International	PhD Domestic	PhD International
LSE RA	$5,500	$14,000	$6,000	$14,000
TA	$7,000	$7,000	$7,000	$7,000
Supervisor RA	$8,500	$14,000	$10,000	$16,000
Gross amount	**$21,000**	**$35,000**	**$23,000**	**$37,000**
Tuition fees	$5,500	$19,500	$5,500	$19,500
Net amount	**$15,500**	**$15,500**	**$17,500**	**$17,500**

[Note: RA – Research Assistantship; TA – Teaching Assistantship; LSE – Lassonde School of Engineering]

In addition, all graduate students will be strongly encouraged to apply for external government awards and other awards tenable at York University. Some examples of high-profile external scholarships are:

- Ontario Graduate Scholarships (OGS);
- Ontario Trillium Scholarship (OTS);
- Canada Graduate Scholarships (CGS);
- The Canadian Institutes of Health Research (CIHR);
- Natural Sciences and Engineering Research Council of Canada (NSERC); and
- Vanier Canada Graduate Scholarships (Vanier CGS).

The supervisory loads for the MASc and PhD students will initially be shared among the currently appointed faculty members, comprising one Full Professor, two Associate Professors, and three Assistant Professors. It is expected that each faculty member will supervise an average of two MASc students and one PhD student in the beginning of the graduate program, but this number is expected to grow gradually to a steady-state level with the increase in the number of incoming students. Together with the continuous hiring of new faculty members per year for the next few years (i.e., up to 23 faculty members by year 2021), sufficient supervisory capacity will be available to support the needs of the proposed graduate programs in Civil Engineering.

7.7 For undergraduate programs, indicate anticipated class sizes and capacity for supervision of experiential learning opportunities, as appropriate.

For graduate programs: Identify all full-time faculty, retired faculty, adjuncts and contract instructors who will be appointed to and who will actively participate in delivering the program, as follows:

Table 7.7.1: List of Faculty Members in the Department of Civil Engineering and Their Areas of Specialization

Faculty Name & Rank	Home Unit	Primary Graduate Program (yes/no)	Area(s) of Specialization or Field(s)		
			Area/Field 1	Area/Field 2	Area/Field 3
Full Members (*Note: does not apply to master's-only programs*)					
Bashir, Rashid (Associate Professor)	Civil Eng	Yes	Unsaturated Soil Mechanics	Hydrogeology	Solid Waste Management
Beddoe, Ryley (Assistant Professor)	Civil Eng	Yes	Landslides and Geohazards	Physical Modelling and Risk Assessment	Geotechnical Field Monitoring
Eldyasti, Ahmed (Assistant Professor)	Civil Eng	Yes	Wastewater Treatment	Energy/Resources Recovery from Waste	Greenhouse Emissions
Krol, Magdalena (Assistant Professor)	Civil Eng	Yes	Groundwater and Site Remediation	Contaminant Transport Modelling	Geothermal Energy
Palermo, Dan (Associate Professor)	Civil Eng	Yes	Reinforced Concrete	Seismic Retrofitting of Structures	Structural Mechanics
Sharma, Jit (Professor and Dept Chair)	Civil Eng	Yes	Geotechnical Modelling	Ground Improvement Techniques	Waste Mechanics
New Hire – Structures (Asst/Assoc. Professor)	Civil Eng	Yes	Structural Engineering	Construction Materials	Computational Mechanics
New Hire – Transportation (Asst/Assoc. Professor)	Civil Eng	Yes	Transportation Engineering	Transportation Materials	Road Safety Engineering
Associate Members					
Members Emeriti					
Adjunct Members					
Saiyed, Sabbir (Adjunct Professor)	Civil Eng	Yes	Transportation Planning	Freight Logistics	Transportation Materials
Cao, Laifa (Adjunct Professor)	Civil Eng	Yes	Foundation Engineering	Ground Improvement Techniques	Earth Retaining Structures
Instructor Members					
New Hire – Teaching Pos. (Asst/Assoc. Lecturer)	Civil Eng	Yes	To be established	To be established	To be established

Graduate Student Supervision

For graduate programs: Identify the supervision of master's major research papers/projects (MRP), master's theses, doctoral dissertations, and post-doctoral students (PDF) by each faculty member who will be appointed to the proposed program completed within the past eight years and currently in progress.

Table 7.7.2: Graduate Student Supervision Record of the Faculty Members in the Department of Civil Engineering

Faculty Member	Completed (within past eight years)				In Progress			
	MRP	Thesis	Dissertation	PDF	MRP	Thesis	Dissertation	PDF
Full Members								
Bashir, Rashid	2	0	0	0	0	3	0	0
Beddoe, Ryley	0	0	0	0	0	0	0	0
Eldyasti, Ahmed	0	0	0	0	0	3	0	0
Krol, Magdalena	0	1	0	0	0	0	2	1
Palermo, Dan	1	5	1	1	0	2	3	0
Sharma, Jit	8	5	4	3	0	3	1	0
Associate Members								
Members Emeriti								
Adjunct Members								
Cao, Laifa	0	0	0	0	0	0	0	0
Saiyed, Sabbir	0	0	0	0	0	0	0	0

Research Funding Received by Faculty

For graduate programs: Identify the research funding received for each of the past eight years by members who will be appointed to the proposed program. This table is intended to show the amount of funding available to support faculty research and potentially available to support students' work, either through the provision of stipends or materials for the conduct of the research. For this reason, grants for travel and publication awarded to faculty should not be included in this table. Major equipment grants, which provide important resources for the work of faculty and students, may be listed separately.

Table 7.6.3: Funding Received by Full-time Faculty Members for the Past 8 Years

	Source			
Year	Tri-Council	Other Peer Adjudicated	Contracts	Institutional
2014	19,000	0	0	552,500
2013	38,000	0	0	402,500
2012	73,913	0	20,000	2,500
2011	125,746	0	29,680	2,500
2010	90,649	20,000	20,000	2,500
2009	90,649	10,000	40,000	0
2008	58,104	0	18,000	0
2007	197,333	0	26,931	0

[Note: The above table lists funding received and held at other institutions prior to the establishment of the Department of Civil Engineering on May 1, 2013.]

The levels of NSERC funding listed in Table 7.6.3 must be viewed in relation to the status and rank of the faculty members in the department. At the time of writing this proposal, three of the current six faculty members (Drs. Krol, Beddoe, and Eldyasti) were hired at the rank of Assistant Professor, and a fourth faculty member (Dr. Bashir) was hired at the rank of Associate Professor, all effective July 1, 2014. They applied for

NSERC DG funds in the fall of 2014 and currently waiting for the results. As such, it is anticipated that the level of NSERC funding will be at a much higher level.

It is also worth noting that each faculty member has been given a substantial start-up grant that will be used to support graduate students. Currently, all faculty members in the Department of Civil Engineering are actively soliciting external funding through other NSERC programs (e.g., Engage), IC-IMPACTS, Ontario Ministry of Transportation, etc.

The two mid-career faculty (Drs. Sharma and Palermo) have been at York University since July 1, 2013. Dr. Sharma has been the Chair of the Department, with Dr. Palermo contributing to all administrative duties related to the establishment of the new department that is now searching for two new faculty members. It is expected that the administrative responsibilities will level off soon, allowing increased research focus and external funding.

8. Enrolment Projections

8.1 Indicate the anticipated implementation date (i.e. year and term of initial in-take), and provide details regarding the anticipated yearly in-take and projected steady-state enrolment target, including when steady-state will be achieved.

The program's starting date is the Fall 2015 with anticipated intake of at least 8 new MASc students and 4 new PhD students. It is expected that with the planned growth of at least 2 full-time faculty members every year, the number of new MASc and PhD students will also increase proportionately. It is expected that first group of MASc students will complete their degree requirements from 2017 onwards and first group of PhD students will do so by from 2019 onwards. As such, when the Department reaches its full complement of 23 full-time faculty members, there will be around 80 full-time-equivalent (FTE) MASc students and 40 FTE PhD students, as shown in Tables 8.1.1 and 8.1.2, respectively. The 2023 projected student numbers represent 3.5 FTE MASc and 1.7 FTE PhD students per faculty member, which are in the same ballpark as those from other established research-intensive graduate programs in Ontario. The target steady-state numbers are 4 FTE MASc and 2 FTE PhD students per faculty members, which are expected to be achieved by the year 2025.

Table 8.1.1: Target Numbers for FTE MASc Students in Civil Engineering

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time Faculty	8	10	12	14	16	18	20	22	23
Intake	8	10	12	14	16	18	20	22	23
Completions	0	0	6	7	8	9	10	11	12
FTE	8	18	24	31	39	48	58	69	80
Student/Faculty	1.0	1.8	2.0	2.2	2.4	2.7	2.9	3.1	3.5

Table 8.1.1: Target Numbers for FTE PhD Students in Civil Engineering

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time Faculty	8	10	12	14	16	18	20	22	23
Intake	4	5	6	7	8	9	10	11	12
Completions	0	0	0	0	5	6	7	7	7
FTE	4	9	15	22	25	28	31	35	40
Student/Faculty	0.5	0.9	1.3	1.6	1.6	1.6	1.6	1.6	1.7

9. Support Statements

Support statements are required from:

- relevant Dean(s)/Principal, with respect to the adequacy of existing human (administrative and faculty), physical and financial resources necessary to support the program, as well as the commitment to any plans for new/additional resources necessary to implement and/or sustain the program
- Vice-President Academic and Provost, with respect to the adequacy of existing human (administrative and faculty), physical and financial resources necessary to support the program, as well as the commitment to any plans for new/additional resources necessary to implement and/or sustain the program
- University Librarian confirming the adequacy of library holdings and support
- University Registrar confirming the implementation schedule and any administrative arrangements
- relevant Faculties/units/programs confirming consultation on/support for the proposed program, as appropriate
- professional associations, government agencies or policy bodies with respect to the need/demand for the proposed program, as appropriate

These documents will be forthcoming within the next few days.

Additional Evaluation Criteria for Joint Degree Programs, Dual Credential Programs, and Combined Programs

For all Joint Degree Programs, as well as Dual Credential or Combined Programs *that will be comprised of a wholly new program(s)*, the program proposal should address the additional evaluation criteria. (The proposal template for Dual Credential and Combined Programs that involve an existing parent program are included in the Guidelines for Intra-Institutional & Inter-Institutional Programs section of the York University Quality Assurance Manual.)

Additional evaluation criteria for all Joint Degree Programs:

- In the *Introduction*, identify the participating programs, and indicate if they are existing programs or are being developed in relation to joint program.
- In the *Program Structure, Learning Outcomes and Assessment* section, describe how the joint program will be structured/governed/ managed to assure the level of integration envisioned will be supported by program requirements, including academic procedures (e.g. for graduate programs, thesis/dissertation and examination guidelines and procedures).
- In the *Program Structure, Learning Outcomes and Assessment section*, describe how methods for the assessment of student achievement of the joint program learning expectations and the degree level expectations are consistent between two institutions.
- In the *Admission Requirements* section, confirm that admissions requirements for the joint program are same regardless of institution applied to.
- In the *Resources* section, provided the required information for both institutions, as appropriate.
- In the *Financial support of graduate students section*, provide details regarding eligibility for financial assistance, where and as appropriate to the concerned program.

Additional evaluation criteria for Dual Credential/Combined Programs that will be comprised of a wholly new program(s):

- Throughout the proposal, all elements of the evaluation criteria must be addressed for both programs.
- For Dual Credential Programs, confirmation in the *Program Structure, Learning Outcomes and Assessment* section that students will normally spend at least one two terms at the partner institution.
- In the *Financial support of graduate students section*, provide details regarding eligibility for financial assistance, where and as appropriate to the concerned program.

Not Applicable.

New Program Proposals: Curricula Vitae of the Faculty

For new graduate programs, the Program Brief must include up-to-date CVs for all faculty members who will be appointed to the proposed program, as well as a copy of the program-specific appointment criteria. The program-specific appointment criteria must be developed in accordance with the Policy on Appointments to the Faculty of Graduate Studies. CVs must be submitted in a standardized format relevant to the proposed program, such as that used by one of the Tri-Councils (CIHR, NSERC, SSHRC) or the current OCGS format. The program proponents should agree upon the format prior to sending out a call to faculty members.

Although they are part of the Program Brief, CVs should be submitted *as an independent document*. Within this document, the CVs should be complied in alphabetical order, with a table of contents. Where appropriate, a program may have separate sections for faculty members who hold full-time (including CLAs) positions at York, retirees, and adjunct appointments. The program-specific appointment criteria should be included in the document as an appendix.

An electronic or soft copy of the CV document in the format describe above should be submitted to the Office of the Vice Provost Academic at the same time as the proposal and external reviewer nominations. At the same time, a copy of the CV document should be submitted to the Office of Dean, Faculty of Graduate Studies, along with any other documentation necessary with respect to the formal appointment to the Faculty of Graduate Studies of those individuals who will participate in the offering of the proposed program.

Full CVs of all full-time and adjunct faculty members in Department of Civil Engineering are included in Appendix E, which is also being submitted as an independent document.

Schulich School of Business

Memorandum

To: Faculty Council
From: Detlev Zwick, Chair, BBA/iBBA Program Director
Date: November 21, 2014

Motion

That the Faculty Council approves the proposed changes to the iBBA curriculum.

Rationale

The Schulich iBBA program has done well over the years in attracting high caliber students to its stream and preparing these students for careers in international business. However, it has been a feature of the iBBA stream that a sizeable number of students in every cohort opt to switch after year one from the iBBA stream and the BBA stream. There are a number of reasons for this. For example, some of the students who switch to the BBA program do so because their preferences have changed. Specifically, the current iBBA program structure is slightly disadvantageous to students opting to specialize in accounting compared to the BBA program. Thus, students that decide after year one to specialize in accounting often find it beneficial to switch to the BBA stream. Another reason – based on insights gained from focus group and survey research – for iBBA students transferring to the BBA program is a perception among iBBA students that the iBBA program is lacking a distinct identity vis-à-vis the BBA program. In other words, iBBA students do not perceive the value proposition of the iBBA program to be sufficiently different from the BBA program to offset some of the perceived drawbacks of the iBBA program, such as less program flexibility and choice of electives. Combined, these reasons signal a clear need to improve the distinctiveness and attractiveness of the iBBA program relative to the BBA program. A two-pronged approach is required:

1) Changes to the curriculum have to be made that increase flexibility for our students to accommodate a range of (often changing) interests. The BBA program currently has an advantage on this dimension. Hence, proposed changes should eliminate this advantage by making the iBBA align more closely with the BBA with respect to elective choice and flexibility. Such curricular changes would also include introducing new course offerings specific and exclusive to iBBA students.

2) Changes to the design of the program, what we call the pathway, should be considered to produce a clearer value proposition of the iBBA program. Central here is the need to design a distinct iBBA experience that the students perceive as unique and valuable.

In sum, the motions in this document aim at accomplishing these two objectives:

1) Increase curriculum flexibility and differentiation (from the BBA).
2) Design a distinct iBBA experience.

We expect that combined these proposed changes will create a unique and differentiated program not only relative to the Schulich BBA program but also relative to all other undergraduate business program in Canada.

DOCUMENT 4

PROPOSED CURRICULUM OVERVIEW	
iBBA (FALL 2015 ENTRY)	
YEAR 1	
FALL TERM	**WINTER TERM**
Microeconomics for Managers SB/INTL 1200 3.00	**Macroeconomics for Managers** SB/INTL 1210 3.00
Managing Contemporary Enterprise SB/MGMT 1000 3.00	**Introduction to Financial Accounting I** SB/ACTG 2010 3.00
Statistics for Management Decisions SB/MGMT 1050 3.00	**Organizational Behaviour Across Cultures** **SB/INTL 1300 3.00**
*** Language Study** Total of 6.00 credits	
****Regionally- Focused Elective(s)** Total of 6.00 credits	
YEAR 2	
FALL TERM	**WINTER TERM**
Introduction to Financial Accounting II SB/ACTG 2011 3.00	**Management Accounting Concepts** SB/ACTG 2020 3.00
International Economics SB/INTL 2200 3.00	**Introduction to Finance** SB/FINE 2000 3.00
Information Systems SB/OMIS 2000 3.00	**Marketing Management** SB/MKTG 2030 3.00
Responsible Business in an International Context **SB/INTL 2000 3.00**	**Operations Management** **SB/OMIS 2010 3.00**
*** Language Study (or Regionally-Focused Elective)** Total of 6.00 credits	
YEAR 3 and YEAR 4	
FALL TERM	**WINTER TERM**
Strategic Management for International Business **SB/INTL 3000 3.00 (proposed course code)**	**Integrative International Business Simulation** **SB/INTL 4200 3.00**
Schulich Electives Total of 24.00 credits (3000 or 4000 level)	
*** Language Study (or Regionally-Focused Elective)** Total of 6.00 credits	
*** *Regionally-Focused Elective(s)** Total of 6.00 credits	
*****Non-Business or Schulich Electives(s)** Total of 18.00 credits	

* Students have 18.00 credits to satisfy advanced level competency in a preferred language. If a student satisfies advanced language prior to completing 18.00 credits in language, they may use the remaining credits towards learning a second language or additional regionally-focused elective(s).

** Students must complete 12.00 credits of regionally-focused study in addition to the 18.00 credits used for language study to be eligible for graduation. Year level requirement does not apply to language or regionally-focused courses.

*** Year level requirements do not apply to non-business electives. A total of 12.00 credits of non-business electives can be taken at the 1000-level at any time during your degree.

Appendix 2: Regionally Focused Courses

Region	Course code	Subject	Course Title	credits	Prerequisite?	Cross listing(other codes)
Asia	FA/ARTH 3345	Art History	Visual Culture in Modern Asia	3		
Asia	AP/HIST 1030	History	Imperialism and Nationalism in Modern Asia	6		
East Asia	GL/HIST 3622	History	The Americas and Asia: Contact and Conflict in the Transpacific World	6		GL/ILST 3622
East Asia	AP/HIST 3762	History	The History of Vietnam from Prehistory to the French Colonial Era	6		
East Asia	AP/HIST 3770	History	Modern China	6		
East Asia	AP/HUMA 3510	Humanities	Religion, Gender and Korean Culture	6		AP/MIST 3520
East Asia	AP/JP 3751	Japanese	Japanese Business Culture and Communication	3		
East Asia	AP/KOR 3800	Korean	Language and Society in Korea	3	Y	
East Asia	AP/POLS 4285	Political Science	Topics in the International Political Economy of Eastern Asia	3		
East Asia	AP/CH 4880	Chinese	Cultural Translation and Chinese Modernities	6	Y	AP/HUMA 4800
East Asia	AP/CH 3711	Chinese	Women Writers in Modern and Contemporary China	3		
Europe	GL/CAT 2670	Catalan	Catalan Language and Culture	3		GL/HUMA 2670, GL/LIN 26
Europe	AP/GER 1790	German	Nationalism, Authority and Resistance: Perspectives on German Culture and Society	9		
Europe	AP/GER 2791	German	Kino-Culture: German Cinema in Competition with Hollywood	6		
Europe	AP/HUMA 3601	Humanities	Vienna in the Early 20th Century: Literature, Art, Culture and Politics (in translation)	3		AP/GER 3601
Europe	AP/HIST 3325	History	Islam and Europe: Past and Present	6		
Europe	AP/HIST 3395	History	From the Defeat of Fascism to the Fall of Communism: Europe Since 1945	6		
Europe	AP/HIST 3392	History	The Spanish Civil War	3		
Europe	AP/HUMA 4180	Humanities	Europe à la mode: Fashion and the Critical Methodologies of European Studies	6		
Europe	AP/HUMA 3816	Humanities	Religion, Culture and Identity in the Balkans	3		
Europe	AP/HUMA 1761	Humanities	Italian Cinema, Literature and Society	9		AP/IT 1761
Europe	AP/POLS 4280	Political Science	Russia in World Affairs	6		
Europe	AP/POLS 4517	Political Science	Debates in Contemporary European Union Politics	3	Y	
Latin America	AP/HIST 2731	History	Introduction to Caribbean History	3		GL/HUMA 2901, GL/SOSC 2
Latin America	AP/HUMA 2310	Humanities	An Introduction to Caribbean Studies	6		
Latin America	AP/POLS 3553	Political Science	Political Economy of Latin America and the Caribbean	6		AP/SOSC 3410
Latin America	AP/POLS 3555	Political Science	Dictatorship and Democratization in South America	3		
Latin America	AP/POLS 3560	Political Science	The Global South: Politics, Policy and Development	6		
Latin America	AP/POLS 4555	Political Science	Latin American Development	3		
Latin America & Asia	ES/ENVS 3227	Environmental Studies	Urban Planning and Practice in the Global South	3	Y	
Latin America (Americas)	GL/HIST 3639	History	Comparative Slavery and Emancipation in the Americas	3		GL/ILST 3639
Latin America / Global South	AP/POLS 4901	Political Science	Development and Inequality in the Global South Capstone	3		
Middle East/North Africa	AP/HEB 3630	Hebrew	Israeli Cinema: Culture, Values, Art	6		AP/HUMA 3630
Middle East/North Africa	AP/HIST 3792	History	The Middle East Since 1800	6		
Middle East/North Africa	AP/HUMA 4821	Humanities	Culture, Society and Values in Israel	3		
Middle East/North Africa	AP/HUMA 2710	Humanities	Introduction to Arab Culture	6		AP/ARB 2700
Middle East/North Africa	AP/HUMA 2700	Humanities	Persian Literature and Culture	6		AP/PERS 2700
Middle East/North Africa	AP/POLS 4422	Political Science	Contemporary Iran: From Revolution to Dissent	3	Y	
Middle East/North Africa	AP/POLS 4561	Political Science	Topics in Middle East Politics	3	Y	
South Asia	AP/HND 3600	Hindi	South Asian Literary Activism: Women Writers and Filmmakers in South Asia and the Dia	3		
South Asia	AP/HUMA 4775	Humanities	South Asian Religions and Popular Culture	3		
South Asia	AP/HUMA 3802	Humanities	Sikh History and Thought: Development and Interpretation	3		AP/MIST 3802
South Asia	AP/HUMA 1846	Humanities	India: Life, Culture and the Arts	6		
South Asia	AP/SOSC 2435	Social Science	Introduction to South Asian Studies	6		
South Asia	AP/SOSC 4436	Social Science	India and Globalization	6		

INTL 4200: Integrative International Business Simulation (INTERNATIONAL CAPSTONE COURSE)

Student teams use a sophisticated business simulation program to manage a firm through multiple years of operation in a competitive industry. All teams must integrate their knowledge of functional areas of international business and global ethics to develop a mission and strategy for their firm, implement the strategy in a dynamic market and consistently revise their strategy in response to the strategic moves of competing firms. In addition, students must research and reflect on what their virtual firm would need to do in order to successfully compete in the region of their specialization.

Not available to BBA students, and not available to exchange students visiting Schulich.

Prerequisites: SB/INTL 4400

iBBA Elective Courses based on Region

Currently, iBBA students must complete 12 credits of globally focused courses. The proposed curriculum amendment would rename this component to *Regionally–Focused* courses, as the way these elective courses will be organized is by region. We have determined six regions at this time: East Asia, South Asia, Middle East/North Africa, Europe, Latin America/Caribbean, North America. For each region, we will select courses that deal with cultural, social and economic issues pertaining to that specific region. Each student will complete at least six (6) credits of regionally focused courses. The overall objective of a regionally-focused course is to deepen students' immersion into a region. In year 3 and 4 students begin to select elective courses and start designing more actively their iBBA program experience. At this juncture, we want our students to select pathways toward a more immersive learning experience by regionally aligning course work and experiential components such as the mandatory Study Term Abroad as well as additional elective courses, including Placement.

A large number of courses offered by York University have been identified as regionally-focused courses* and have been allocated accordingly. A sample list of these courses is appended as Exhibit 1.

* Lists of regionally specific courses are subject to change by the Program Directors.

Undergraduate Program Committee

Restructuring the iBBA Curriculum: iBBA Sub-Committee Task Force's Recommendations

Purpose of the iBBA

It is the objective of the Schulich iBBA program to educate students to perform successfully in positions of responsibility in an international business environment. Unlike the global orientation of the Schulich BBA program that focuses on the *similarities* of business practice and culture across regions, the Schulich iBBA program focuses classroom and experiential learning opportunities on understanding and managing *unique differences* of a specific regional and local market and business environment. Thus, the 'i' that stands for 'international' in iBBA also signifies 'immersion': the opportunity to immerse oneself deeply in a unique cultural, social and economic context of a geographic region. Importantly, the 'internationalization as immersion' formula does not represent a limitation in a student's global mindset and ability to succeed in a workplace outside the chosen region. On the contrary, developing and training the ability to immerse oneself thoroughly and competently in a specific regional context produces a highly unique and, most importantly, *transferable* capability that increases a student's likelihood for success in *any* socio-economically and culturally diverse business environment. In addition, the program is designed to ensure that our graduates are cognizant of the role of business in society with particular attention paid to the specific moral and ethical responsibilities expected in international business contexts.

A Case for Change

The Schulich iBBA program has done well over the years in attracting high caliber students to its stream and preparing these students for careers in international business. A recently established database of around 250 iBBA alumni shows that many graduates are working abroad. Many more are working for Canadian companies in positions with international duties. However, it has been a feature of the iBBA stream that a sizeable number of students in every cohort opt to switch after year one from the iBBA stream and the BBA stream. There are a number of reasons for this. For example, some of the students who switch to the BBA program do so because their preferences have changed. Specifically, the current iBBA program structure is slightly disadvantageous to students opting to specialize in accounting compared to the BBA program. Thus, students that decide after year one to specialize in accounting often find it beneficial to switch to the BBA stream. Another reason – based on insights gained from focus group and survey research – for iBBA students transferring to the BBA program is a perception among iBBA students that the iBBA program is lacking a distinct identity vis-à-vis the BBA program. In other words, iBBA students do not perceive the value proposition of the iBBA program to be

sufficiently different from the BBA program to offset some of the perceived drawbacks of the iBBA program, such as less program flexibility and choice of electives. Combined, these reasons signal a clear need to improve the distinctiveness and attractiveness of the iBBA program relative to the BBA program. A two-pronged approach is required:

1) Changes to the curriculum have to be made that increase flexibility for our students to accommodate a range of (often changing) interests. The BBA program currently has an advantage on this dimension. Hence, proposed changes should eliminate this advantage by making the iBBA align more closely with the BBA with respect to elective choice and flexibility. Such curricular changes would also include introducing new course offerings specific and exclusive to iBBA students.

2) Changes to the design of the program, what we call the pathway, should be considered to produce a clearer value proposition of the iBBA program. Central here is the need to design a distinct iBBA experience that the students perceive as unique and valuable.

In sum, the proposals expressed in this document aim at accomplishing these two objectives:

1) Increase curriculum flexibility and differentiation (from the BBA).
2) Design a distinct iBBA experience.

All proposed changes and amendments fall under two categories:

1) Curricular changes and
2) Pathway changes.

Curricular changes are changes that affect mandatory and elective course offerings as well as the timing of offerings in the iBBA program structure. Pathway changes refer to changes in the design of the student experience while in the iBBA program. These changes are not setting up strict requirements for students about course selection, study exchange location and placement site. However, they offer a purposeful framework for designing a unique and immersive learning experience. We expect that combined these proposed changes will create a unique and differentiated program not only relative to the Schulich BBA program but also relative to all other undergraduate business program in Canada in which the student is funneled from a more general global/international business education progressively toward a more focused perspective on region and then down to a country with the choice of an exchange school and placement site (see figure 1).

These proposed changes, if adopted, will take effect for students entering the iBBA program in Fall of 2015. Current first year students are not affected by the curricular and pathway changes. However, all students in the program are welcome to pursue a regionally immersion pathway.

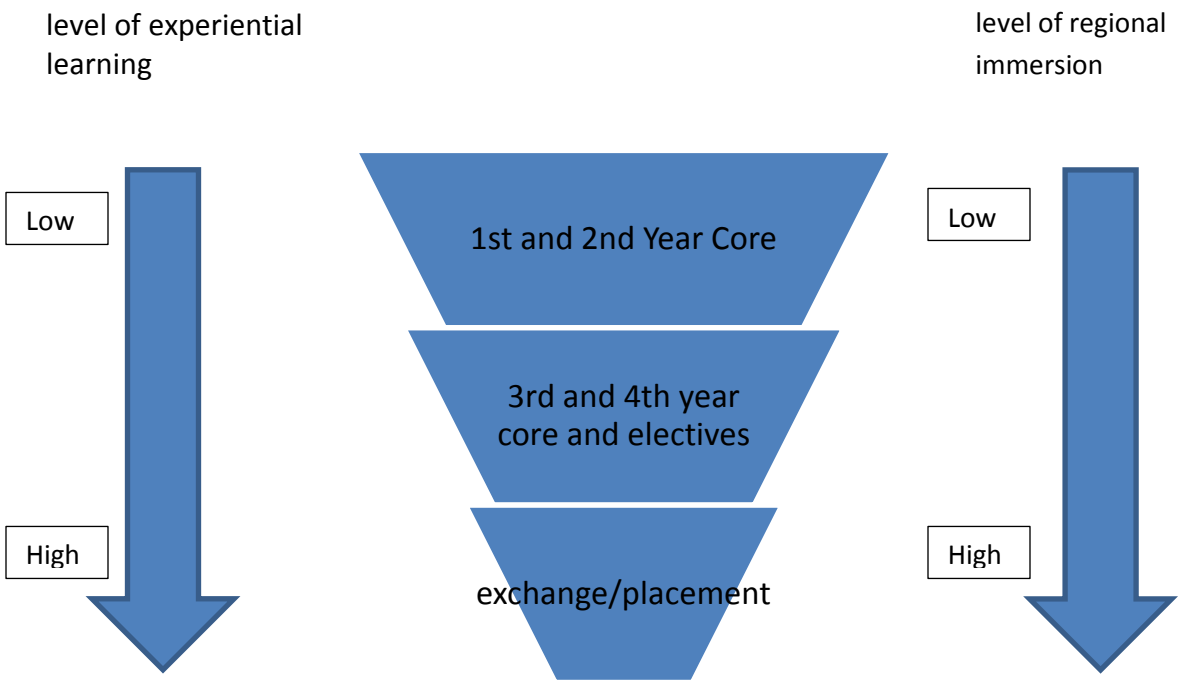


Figure 1: Progressive Immersion and Experiential Learning Design of the iBBA Program

I. Curricular Changes

Currently the iBBA stream – when compared to the BBA program – is perceived as less flexible in terms of selecting elective courses, scheduling the mandatory exchange semester with regard to taking core and elective offerings and picking specializations. Many non-Schulich elective credits available to BBA students are replaced by prescribed courses to iBBA students, including 18 language credits plus 12 Globally-Focused. Hence, in order to offer iBBA students more flexibility and choice in designing their program pathway, and to move students from a more general (international) business education of year 1 and 2 to a more self-designed and immersive learning experience (see figure 1) we propose five (5) changes (for a summary representation of all changes in the form of a curriculum overview chart see Appendix 1). We propose to:

1) ***Change the following courses:***
    a. ***Cross Cultural Management (INTL3350, 1.5 credits) and Organizational Behaviour Across Cultures (INTL1300, 3.00 credits) consolidated into one course: Organizational Behaviour Across Cultures (INTL1300, 3.00 credits). This course will be offered in the winter term of year 1.***
    b. ***International Business Ethics (INTL 3500, 3.00 credits) and Business and Sustainability (INTL 3400, 1.5 credits) consolidated into one course: Title Responsible Business in an International Context, 3.00 credits. This course will be renumbered as INTL 2000 3.00–level course and offered in the first term of the second year.***

    Rationale: These changes will not lead to any loss in content but have the advantage of aligning the iBBA program more closely with the BBA program. They also free up 3 credit hours that can be used more effectively for a capstone course on international strategy (see proposal below and attached document). These changes, combined with changes number 2 and 3, below, increases flexibility because only one mandatory course remains in 3rd year (Strategic Management for International Business (see proposed course table in **Appendix 1**). This fact enables iBBA students to take their mandatory exchange term in the first term of the third year for those who wish to do so, which in the current structure is a very difficult thing to do.

2) ***Move OMIS 2010, currently offered in the first term of the THIRD year to the second term of the SECOND YEAR.***

    Rationale: this change creates more symmetry with the BBA stream and frees up the third year for regionally focused elective offerings. The third year now becomes the beginning of a self-designed pathway into an international/regional social, cultural and economic

context because only one mandatory course remains in 3rd year (Strategic Management for International Business). As stated above, this change also offers more flexibility with regard to the exchange term abroad.

3) ***Replace the 18-credit language only requirement with an 18- credit maximum requirement of regionally-focused courses including language (min. of 6 credits).***

Rationale: Currently all students entering the iBBA program have to take 18 credits of language courses and must successfully complete at least one third-year university-level (advanced) course in her or his chosen language. Students that can fulfill the third-year university level language requirement with fewer than 18 credits may elect to take more language courses or complete the balance of the 18 credits with regionally-focused elective courses. A list of currently available regionally-focused courses is attached as Appendix 2. This list is subject to change at the discretion of the program director.

4) ***Create a fourth year International Capstone Course***

Rationale: Currently the required courses in the BBA stream are capped by a so called Capstone course, which is an integrative simulation based course. Because of its integrative nature a capstone course allows for high level experiential learning. Such an integrative course is currently missing from the iBBA stream. To fill this gap we recommend adding a new course tentatively entitled 'Integrative International Business Simulation, designated as SB/INTL4200 3.00 (see Appendix 3). This course will occupy the 3 credits that have been freed up as a result of the proposed amalgamation of two courses in Cross Cultural Management as well as the Business Ethics/Sustainability. Apart from offering an integrative learning experience at the end of the program, this course would constitute a unique iBBA component, thus heightening the perception of the program as distinct from the BBA.

5) ***Refocus required 12.00 credits of Globally-focused study to required 12 credits of "Regionally-focused electives."***

Rationale: Currently, iBBA students are required to take 12 credits of "Globally – Focused" non-Schulich courses. With the new positioning of the program as regionally focused and the corresponding re-organization of non-Schulich elective course options based on regional content, this change increases clarity of purpose of this program component. We have determined six regions at this time: East Asia, South Asia, Middle East/North Africa, Europe, Latin America/Caribbean, North America. For each region, we have select courses that deal with cultural, social, historical political and economic issues pertaining to that specific region. While non-Schulich regionally-focused credits

can be spread across all approved courses, students will be encouraged to concentrate this coursework on one specific region. As a result of this change, the current list of globally focused courses will be retired and replaced with the list of regionally focused courses shown in Appendix 2 (also see point 3, above).

II. Pathway Changes

These changes are designed to create a clear and unique Pathway for iBBA students to become competent and capable in a region-specific business context. These changes do not, however, spell out mandatory choices. Rather the purpose of the pathway changes are to create an attractive formula for the student to design a more internationally focused and immersive program experience in the second half of the iBBA program (i.e., Year 3 and 4). It is our expectation that once students opt to focus Schulich and non-Schulich required electives, placement, language and the study abroad experience on one region and even country, they will acquire a unique and transferable capability that enables these students to succeed in a variety of cross-culturally diverse business contexts (see Appendix 4 for more details on the regional groupings). There are four changes under this rubric:

1) ***Non-Schulich electives (politics/history/culture, etc.) will be clustered under regions***:

   Rationale: In year 3 and 4 students begin to select elective courses and start designing more actively their iBBA program experience. At this juncture, we want our students to select pathways toward a more immersive learning experience by regionally aligning course work and experiential components such as the mandatory Study Term Abroad as well as additional elective courses, including Placement.

2) ***Priority for Exchange Term Spot in the Region of Choice***:

   Rationale: by giving iBBA students priority to complete their mandatory exchange term abroad at an exchange partner that operates in the language space and region of concentration we aim at three outcomes, which align with the overall objective of the restructuring process: 1) increase the incentive for students to make a clear choice for a region, 2) intensify the regional learning experience, and 3) enhance the perception that the iBBA offers unique benefits. Students will be eligible for priority placement if they elect to adopt a particular regional focus with a minimum of 18 credits allocated to one region (including language credits).

3) ***Placement***

Rationale: similar to the exchange study term, the aim here is to encourage students to pursue placement opportunities in the region of their concentration. To support this process, the program leadership has created a database with iBBA alumni within and without Canada that can be sourced selectively for generating such placement opportunities. While students are encouraged to take on international placement opportunities, the iBBA Program accepts domestic placement as long as the placement contains a substantial international component, ideally with actors in the region of concentration. Placement is optional.

4) ***Study Term Abroad***

This component envisages a guided study trip abroad, complemented with lectures and projects to learn about economic, cultural, and social conditions in the country and how they affect market behavior, firm strategy, and government action. Possible options are (a) for a group of iBBA students to take courses at Schulich to study a theme (subject), such as Private-Public partnership initiatives in certain country or region, before they embark on the study tour, or (b) study a country or a region, courses (taught at Schulich) that emphasis on the economic, political and cultural environment of the host country followed by on the ground experience at the destination. This program will be optional and the courses will count towards Schulich business electives

Conclusion

We believe that in combination the curricular changes and the pathway changes accomplish the two main objectives we set for ourselves:

1) To increase program flexibility
2) To design a unique and distinct iBBA experience

If adopted these changes will further enhance the high quality of the Schulich iBBA program and not only produce a clear and identifiable identity for the program, but also set itself further apart in quality and vision from its national competitors.

iBBA Existing Requirements

Core Courses

YEAR 1

SB/INTL 1200 3.00 Microeconomics for Managers
SB/INTL 1210 3.00 Macroeconomics for Managers
SB/MGMT 1000 3.00 Managing Contemporary Enterprise
SB/ACTG 2010 3.00 Introduction to Financial Accounting I
SB/MGMT 1050 3.00 Statistics for Management Decisions
SB/INTL 1300 3.00 Organizational Behaviour Across Cultures

YEAR 2

SB/ACTG 2011 3.00 Introduction to Financial Accounting II
SB/ACTG 2020 3.00 Management Accounting Concepts
SB/OMIS 2000 3.00 Information Systems
SB/MKTG 2030 3.00 Marketing Management
SB/FINE 2000 3.00 Introduction to Finance
SB/INTL 2200 3.00 International Economics

YEAR 3

SB/OMIS 2010 3.00 Operations Management
SB/INTL 3350 1.50 Applied Cross Cultural Management
SB/INTL 3400 1.50 Business and Sustainability
SB/INTL 3500 3.00 International Business Ethics

YEAR 4

SB/INTL 4400 3.00 Strategic Management for International Business

Elective Course Requirements

Not all elective courses are offered every term. Schedules for elective courses can be found in the most recent York University Undergraduate online Lecture Schedule.

YEAR 1
- 6.00 credits of NON-SB elective course(s) (minimum 1000 level)

YEAR 2
- 6.00 credits of NON-SB elective course(s) (minimum 1000 level)

YEAR 3 & 4
- 18.00 SB electives
- 12.00 NON-SB electives
- 24.00 SB/NON-SB electives
- In Year 3 (i.e. once students have earned 60.00 credits and before earning 90.00 credits) electives must be 2000 level or higher
- In Year 4 (i.e. over 90.00 credits) electives must be 3000 level or higher

Note:
1. Management elective courses coded SB are taken in the Schulich School only.
2. Non-management elective courses coded NON-SB are taken in other York Faculties.

ACADEMIC POLICY, PLANNING
& RESEARCH COMMITTEE

Report to Senate
at its meeting of March 26, 2015

FOR ACTION

1. **Amendments to the Senate – Board of Governors Policy on Endowed Chairs and Professorships**

Academic Policy, Planning and Research recommends

that Senate approve amendments to the Policy on Endowed Chairs and Professorships as set out in Appendix A .

One of APPRC's priorities for 2014-2015 involves modernizing and expanding the Policy on Endowed Chairs and Professorships and its associated guidelines and procedures. The current policy is outdated, narrowly cast and lacking in clarity. A project to modernize and expand the Policy per se began in 2012 when the York Research Chairs program was in development. The Policy was determined to have significant gaps and shortcomings. The very term "endowed) is quite limited in conventional usage, and some positions are funded without a permanent benefaction). It was unhelpful in terms expectations attached to positions and did not specify that that appointments must conform in full to all other relevant University procedures.

The major features of the proposed amendments:

- a new name – Policy on the Establishment and Designation of Research and Teaching Chairs and Professorships and Distinguished Fellowships
- more clearly defined but expansive categories – Research and Teaching Chairs and Professorships
- a new category of Distinguished Fellow
- articulation of the purpose and aims of the Policy
- explication of the expected financial support for positions
- guidance to donors on what they can expect, but more importantly what they cannot do – consistent with the Statement of Principles on External Partnerships approved by Senate in 2013[1]

The Policy is accompanied by Guidelines and Procedures that give greater precision to the requirements of incumbents, duration of their terms, and criteria and mechanisms for appointment and renewal. Expectations associated with teaching build on the University Academic Plan's insistence that "we take it as axiomatic that active researchers are active teachers, and we insist on the inseparability of research and pedagogy at all levels as part of this culture."

The Vice-President Research and Innovation has undertaken consultations on the amendments to the Policy (and the proposed Policy in action item 2) as these policies were in development, and has reported that the Deans and Principal have expressed their support.

[1] Senate Executive is due to review the Statement this year.

Amendments to the current Policy require approval by both Senate and the Board of Governors

Documentation is attached as

Appendix A Proposed Amendments to the Policy on Endowed Chairs and Professorships
Appendix B Guidelines and Procedures for the Establishment and Designation of Research and Teaching Chairs and Professorships and Distinguished Fellowships
Appendix C Current Policy on Endowed Chairs and Professorships
Appendix D Statement of Principles for External Partnerships

2. **Establishment of a Policy on Externally Funded Regular Named Chairs**

Academic Policy, Planning and Research recommends

that Senate approve a Policy on Externally Funded Regular Named Chairs

APPRC also recommends approval of companion legislation enabling the creation of Regular Named Chairs. As described in the Policy, Regular Named Chairs differ by virtue of expectations and level of funding. Chair holders will not have modified teaching loads, but will have a new form of recognition for their scholarly contributions.

Documentation is attached as Appendix E.

FOR INFORMATION

1. **Meetings with the Deans, Principal and University Librarian**

The Committee's meetings with the Deans, Principal and University Librarian have now concluded. We are extremely grateful for the information provided in written reports and the additional insights that emerged in dialogue. APPRC will provide Senate with an overview in April. The Committee has received a number of thoughtful recommendations about priorities that could feature in the next iteration of the University Academic Plan along with information about the current state of academic planning and the objectives that are being pursued.

2. **Planning Forum on the Institutional Strategic Direction Documents**

As previously reported to Senate, the Committee will sponsor a planning forum on the morning of April 23 to facilitate discussion of an Institutional Strategic Directions document now in preparation. Senators and other members of the community will be invited to attend and participate in the forum. Details about the location and format of the forum will be issued shortly. The document will be available in advance of the forum.

Rebecca Pillai Riddell, Chair

Appendix A – APPRC Report

Policy on the Establishment and Designation of Research and Teaching Chairs, Professorships and Distinguished Fellowships (Proposed Amendments to the Policy on Endowed Chairs and Professorships)

Description: This is a Senate and Board of Governors Policy for which there are associated Guidelines and Procedures

Policy

Purpose and Aims

In furtherance of its academic goals and out of a desire to recognize and reward faculty members for their achievements, York University may establish Research and Teaching Chairs and Professorships, and Distinguished Fellowships, which may also have the following aims:

- honour meritorious scholars who have demonstrated exceptional teaching and research
- recognize, in the names that may be assigned to these positions, the University's benefactors, supporters, past faculty members and others
- advance strategic plans, build on strengths and support emerging foci
- enhance the University's research and teaching
- attract and retain prestigious faculty members

Notwithstanding the source of funding or type of position, the criteria guiding the establishment of designations under this policy are the recognition of high merit and the advancement of the University's academic mission.

Applicability of the Policy

This policy applies to the establishment of named and / or funded positions, as well as to the appointment, review and renewal of incumbents.

Sources and Nature of Funding

The funding of chairs, professorships and distinguished fellowships covered by this policy may be derived in whole or in part from donations, University or Faculty funds, or financial arrangements with other institutions. Financial support may flow out of a perpetuated bequest or fixed term funding.

Normally, funding will be sufficient to provide for 100 per cent of costs without additional support from the University's operating budget.

Donors

Donors shall not be involved in selection or review processes for any position.

Donors may, however, be expected to take an interest in the activities of the incumbents of the chairs and professorships they have funded. They will receive an annual report on the activities of incumbents and may participate in other forms of engagement and support.

Naming of Chairs and Professorships

Research and Teaching Chairs **or** Professorships will be distinguished from other chairs by the inclusion of the words “Research” or “Teaching” in their titles. The title may also include the names of donors, or others commemorated such as past York University scholars.

Terms and Conditions

The terms, conditions and expectations of named and funded positions shall be explicitly defined and will include a sustainable financial plan. Financial support shall be commensurate with the research, teaching and educational leadership activities associated with the chair, professorship or distinguished fellowship. Support of positions will be commensurate with the goal of enhancing the capacity of a faculty member to undertake research, teaching and educational leadership activities.

Disestablishment

Disestablishment of chairs, professors and distinguished fellowships shall be provided for at the time of establishment or by mutual agreement of the University and the donor.

Effective Date of the Policy

This Policy shall be take effect from the time it is enacted by Senate and the Board of Governors. It does not apply retroactively to any pre-existing position with the exception that the appointment and renewal procedures described below shall apply provided that they are consistent with the terms under which a pre-existing position was established.

Positions and Designations Not Covered by this Policy

The following positions and designations are not covered by this policy:

- Distinguished Research Professors and University Professors, which are honorary designations under other policies and procedures
- Chairs established by programs created by external bodies, such as Canada Research Chairs and Canada Excellence Research Chairs, Killiam Awards, or NSERC Industrial Research Chairs
- Regularly Named Chairs, which are covered by a separate Policy

Appendix B – APPRC Report

Establishment and Designation of Research and Teaching Chairs, Professorships and Distinguished Fellowships: Guidelines and Procedures

Guidelines

Funding

Research and Teaching Chairs, Professorships and Distinguished Fellowships may be funded through

- an endowment
- fixed term funding from external sources
- a combination of sources including eligible internal funds.

Funding for incumbents shall be commensurate with explicit academic goals and objectives, and shall be sufficient to cover 100 per cent of costs (which will vary with the nature of positions, expectations and areas of scholarship). Minimum amounts and financial terms shall be consistent with those promulgated by the University, which may be expected to be adjusted periodically.

Funding for fixed term Chairs and Professorships shall be for a minimum of five years. In the event that necessary additional funding is secured, a limited term Chair or Professorship may be converted to an Endowed Chair or Professorship without further review or approval. Similarly, should the necessary additional funding be realized, an endowed Professorship may be converted to an endowed Chair, without further review or approval.

Funding for limited term Distinguished Fellowships shall be for a minimum of 3 years. Distinguished Fellowships may only be converted to other Chairs or Professorships upon successful review and approval.

In addition to covering the salary and benefits of the holder, funding for Research and Teaching Chairs and Professorships shall include provide for an appropriate level of scholarly and research support that may include one or more of the following:

- unrestricted or restricted accounts in support of the research and teaching goals
- provisions for a stipend
- funding for the relief of teaching
- provisions for infrastructure requirements of an externally recruited appointee

Teaching Requirement

York University prides itself on being comprehensive in its approach to education and in the contact of all faculty members with undergraduate and graduate students. At the same time appointments may offer a number of means through which research intensity beyond normal expectations can be recognized through provision of teaching release time. Accordingly, Research Chairs and Professorships will be expected to include a teaching load that is not less than 50 per cent of the normal load for full time professors in the applicable discipline, and in any case not less than a course load of 1.0. Teaching Chairs and Professorships will be expected to maintain course teaching load equivalent to the norm for faculty members in their Faculties.

Leadership and Community Engagement

All appointees will be identified and recognized leaders of scholarship, research, creative activity, and teaching. As such, they are shall provide leadership in the overall development of the research and teaching mandate of the University and to be active mentors for their colleagues.

Research and Teaching Chairs

The establishment of a Research and Teaching Chair represents a major commitment by the University to the development of an area of research, scholarship and teaching. The holder of a Chair should be of great distinction and be an exceptionally productive well established scholar normally at the rank of Professor.

The normal appointment as Chair is for a fixed term of five years, renewable up to two times (for a total maximum appointment time of 15 years), contingent upon successful performance review. Upon approval of the Provost, there may also be provision to extend an outgoing appointee by one additional year to facilitate the completion of a body of work or to provide for a smooth transition to a new Chair holder.

Professorships

The establishment of a Research and Teaching Professorship represents a commitment by the University to the development of an area of research, scholarship and teaching. The holder of a Professorship should be of distinction and be a highly productive scholar normally at the rank of Assistant Professor or Associate Professor.

The normal appointment to a Professorship is for a fixed term of five years. A term may be renewed not more than once and renewal is contingent upon a successful performance review. Upon approval of the Provost, there may also be provision to extend an outgoing appointee by one additional year to facilitate completion of a body of work or to provide for a smooth transition to a new Professorship holder.

Distinguished Fellowships

Distinguished Fellowships may be established to assist the University in the development of new academic initiatives or in the further development of established areas of scholarship. They may be awarded to visitors from outside the University as well as to internal faculty members.

The appointment for Distinguished Fellowships shall be for a term of up to three years, and may be extended by up to two additional years upon approval of the Provost.

Reporting and other Expectations

All incumbents shall give a lecture to the University community in the first year of their appointment, and if renewed, the first year of subsequent re-appointments. They also will be expected to participate in activities that promote the University's research and teaching or recognize its donors.

Incumbents will also submit an annual report of their activities to their Department Chairs and Dean/Principal that may be made available to the University Executive and to the donor(s) or their representatives. The format of reports will be determined by the Vice President Advancement in consultation with the Faculties.

Duration of Terms

Individual appointees shall hold their positions

- for the term specified unless renewed according to the specified process

- for the term specified unless it has been determined that they are not fulfilling the general criteria of this Policy and / or the explicit expectations associated with a position must relinquish the position
- until such time as they retire or depart from the University, at which point they shall automatically relinquish the position

Procedures

Establishment of a Research of Teaching Chair or Professorship

In accordance with the York Act, individual and program-based Research and Teaching Chairs and Professorships are formally established by the Board of Governors after consultation with Senate, normally through its Academic Policy, Planning and Research Committee.

The following are the legislative steps to the formal establishment of a new designation:

- The Vice-President Academic and Provost, having determined that a proposal is consistent with York's academic interests and all relevant policies and agreements, shall make a recommendation to the Academic Policy, Planning and Research Committee of Senate seeking its concurrence.
- Upon concurring with a recommendation, the Academic Policy, Planning and Research shall inform Senate of its decision and transmit a record of its action to the Board of Governors.
- The Academic Resources Committee of the Board shall be responsible for making recommendations to approve proposals to the Board.

A change in the name of a Chair or Professorship fellowship shall follow the same pathway.

Establishment of a Distinguished Fellowship

The establishment of a Distinguished Fellowship is approved by the Provost, who must be satisfied that a proposal is wholly consistent with the aims of this Policy, articulates appropriate expectations, and has a sufficiency of resources to ensure its sustainability for the term specified. Senate and the Board of Governors shall be informed of the establishment or disestablishment of Distinguished Fellowships.

Proposals

The Deans/Principal or academic Vice Presidents may propose the establishment of a Research and Teaching Chair, Professorship or Distinguished Fellowship through the Office of the Provost and Vice President Academic.

Proposals shall include

- a rationale for the Chair or Professorship
- a description of the scope of the proposed position
- a description of its alignment with all relevant University and Faculty academic plans

Proposals shall also be accompanied by detailed terms of reference for the position that will include the Faculty / unit of appointment, general requirements and specific expectations, and guidelines for the use of funds.

Proposals must also include a funding plan that demonstrates the presence of funding sufficient to cover 100 per cent of all costs.

Confidentiality Provision

If the University or benefactor(s) wish to maintain the confidentiality of a proposal until a public announcement, the Academic Policy, Planning and Research Committee shall exclude any identifying information from its reports to Senate, and the Board of Governors shall consider proposals under its confidentiality procedures.

Selection, Review and Renewal: Principles

Positions that are fully funded through external sources are expected to be primarily oriented towards external recruitment to enhance York's research and teaching capacity, although highly qualified internal candidates will also be eligible in all instances.

Selection processes must be open, transparent, and respectful of all normal hiring processes for the University when external recruitment is sought. Specific qualifications and expectations must be approved by the Provost prior to engaging in a selection process.

Similarly, review of incumbents in cases where renewal is permitted, must follow a clear, transparent, and collegial process led by the Dean/Principal of the Faculty(ies) in which the position resides.
If at any time during the period, incumbents are not meeting objectives, the Dean/Principal, in consultation with the Provost and unit head, may make a recommendation to the Provost and President to terminate the term of the holder.

Appointment of Research and Teaching Chairs and Professorships

The Dean(s)/Principal shall appoint an appropriate selection committee. In instances where an interdisciplinary focus extends across Faculties, the selection committee will be formed in consultation with the relevant Deans/Principal, and the Provost. For external hires, the Dean/Principal must submit a detailed description of the qualifications and expectations of the individual to be sought as part of the normal complement planning process. The enhanced expectations for the position also must be clearly articulated in advertising, and throughout the selection process, with approval of all advertisement by the Provost.

Nominations to the Provost by the Dean/Principal must respect in full the criteria of this Policy and the expectations of the position, and shall include a clear and detailed rationale for the recommendation.

Appointment of Distinguished Fellows

The Faculty Dean/Principal will ensure the appointment of an appropriate selection committee.

Nominations to the Provost by the selection committee must respect in full the criteria of this Policy and the expectations of position and shall include a clear and detailed rationale for the recommendation.

Selection of Incumbents: Eligibility and Authorization

Positions that are fully funded through external sources shall be primarily oriented towards external recruitment to enhance York's research and teaching capacity, although highly qualified internal candidates will also be eligible in all instances.

Processes for the selection of honorees must be open, transparent, and fully respect all applicable hiring protocols and procedures for the University when external recruitment is sought. Prior to a search, specific qualifications and expectations for candidates must be approved by the Provost.

The Provost shall be responsible for recommending individuals for the awarding of a designation by the President of the University.

Renewal of Incumbents

If incumbents occupy a position for which renewal is provided for, the process of review and renewal must be clear, transparent, and collegial. Such processes are normally led by the Dean or Principal of the Faculty(ies) to which the position is attached.

Review of Chairs and Professorships

Where the terms of reference allow for renewal of incumbents, the review process for consideration of renewal will commence one year prior to the end of the current appointment.

The Dean(s)/Principal establish an appropriate review committee of the incumbent. In instances where the interdisciplinarity extends across Faculties, the review committee will be formed in consultation with the relevant Deans/Principals and the Provost. For Research Chairs and Professors, the review committee shall include a representative of the Vice President Research and Innovation. The review process shall be open and transparent and shall allow for a response by the incumbent to the findings of the review before a recommendation is finalized.

Recommendations to the Provost based on the outcome of the review must be received at least eight months prior to the expiry of the term of the incumbent

Request for an Extension

Requests for extensions of an appointment must be made in writing to the Provost and Vice President Academic by the holder and must be supported by the relevant Dean(s)/Principal

Termination of an Appointment

The applicable Dean(s) / Principal, finding that an appointee has manifestly not fulfilled the terms of the appointment, the may recommend that the Provost terminate incumbency at any time prior to the end of a term or the normal review.

Appendix C – APPRC Report

Endowed Chairs and Professorships (Current Policy)

Legislative History: Approved by Senate: 1988/06/23; Approved by the Board of Governors: 1988/07/19; Date Effective: 1988/07/19

Approval Authority: Board of Governors and Senate

Signature: William A. Dimma, Susan Mann

Definitions

The endowment of a Chair or Professorship is an important event in the academic life of a university. It enhances the academic purposes of the university by providing continuing support for an established field of study or by providing the focal point for a new emphasis or area of inquiry. Often, where the endowment is the result of a benefaction, the Chair or Professorship will honour a named individual or organization.

This statement has been developed to make explicit the procedure governing the establishment of an endowed Chair or Professorship.

A Chair is a permanent professorial position having at least the following attributes:

1. an endowment of sufficient magnitude to support in perpetuity or for a considerable period of time an academic position to which an individual of high distinction will be appointed; the appointment may or may not be for a specified period of time: normally, the endowment should also provide an additional measure of scholarly/creative/research support;
2. an acceptable academic orientation or focus;
3. a requirement that the occupant of the Chair will provide an annual report to the Dean of the Faculty in which the Chair is housed, and give one or more public lectures;
4. appointment procedures and other conditions which are acceptable and which are consistent with prevailing University procedures;

A Professorship is a professorial position having at least the following attributes:

1. an endowment of sufficient magnitude to support the appointment of an individual of high distinction;
2. an acceptable academic orientation or focus;
3. a requirement that the occupant of the Professorship will provide an annual report to the Dean of the Faculty in which the Professorship is housed, and give one or more public lectures;
4. appointment procedures and other conditions which are acceptable and which are consistent with prevailing University procedures;

Endowed Chairs and Professorships (Current Procedures)

Procedures

Under the York University Act, it is the Board of Governors which has the authority to establish a Chair or a Professorship. As the existence of a Chair or Professorship can have a major impact on the academic priorities and directions of the University, it is consistent with Senate's responsibilities

under the Act that the conditions and focus of a proposed Chair/Professorship should be found to be acceptable to Senate before it is established.

Given this shared responsibility, the following shall be the procedure for establishing a Chair or Professorship at York University:

The Vice-President (Academic) and Provost shall assess each proposal for the establishment of a Chair or Professorship. Where he/she is prepared to make a positive recommendation, he/she shall make that recommendation to the Academic Policy, Planning and Research Committee of Senate (APPRC) and shall provide relevant supporting documentation.

In those cases

1. where the recommendation is that the proposed Chair or Professorship is consistent with an existing Senate approved teaching or research program, and that other terms and conditions are acceptable
2. and where APPRC concurs in this recommendation,

then the recommendation and APPRC statement of concurrence will be forwarded directly to the Board of Governors for action. Senate will be informed of this action.

In all other cases, the Vice-President's recommendation will be considered by Senate's APPRC and the findings of APPRC together with the Vice-President's recommendation shall be forwarded to Senate for consideration. In those cases where Senate expresses support for the establishment of the Chair or Professorship, then a recommendation for establishment of the Chair or Professorship, as the case may be, shall be forwarded to the Board for consideration.

Appendix D – APPRC Report

Statement of Principles for External Partnerships

Legislative History: Approved by Senate: 2013/03/28

Approval Authority: Senate

Signature: Harriet Lewis

York University has benefited from numerous collaborative relationships that support its academic mission. The current University Academic Plan calls for the pursuit of "opportunities for York to build upon its leadership in…partnerships for teaching, learning and research". These shall be "consistent with institutional autonomy and the trust reposed by the public." York recognizes the benefits conferred by these interactions, and welcomes them as they assist in the fulfillment of its Mission and the expression of its values in a spirit of mutual respect. Given that efforts are likely to foster increasingly diverse external relations and community engagement that promote the full spectrum of academic activities, Senate affirms the following principles:

Academic Freedom: Partnerships shall be consistent with academic freedom, which includes the right to examine, question, teach, learn and disseminate opinions on any questions related to teaching, professional activities and research both inside and outside the classroom without impediment.[1]

Academic Integrity: Partnerships shall be consistent with the creation and dissemination of knowledge, quality teaching, learning and research, and the distinctive aspects of the University's Mission.

Institutional Autonomy: Partnerships shall operate in accordance with all of the University's applicable policies, regulations, processes, practices and collective agreements. Agreements establishing external partnerships should contain clear mechanisms and procedures for resolving disputes between the parties.

Conflict of Interest: Partnerships shall be subject to the University's Conflict of Interest Policy and Guidelines, including the required disclosure of a conflict of interest or potential conflict of interest by all persons involved.

University Governance: Partnerships shall be subject to the legislated authority of the Senate and Board of Governors, and the processes that flow from that authority, including the sole responsibility of Senate and its Faculty Councils for the establishment and modification of programs, courses, academic standards, admissions criteria, evaluation of its students, and student academic awards, and the joint responsibilities of the Senate and Board of Governors for the establishment of units and chairs.

[1] Definitions of academic freedom are found in the YUFA and CUPE 3903 collective agreements, and in the current Memorandum of Agreement between the Osgoode Hall Faculty Association and the University. In June 2009 Senate approved a motion proposed by Senator Roxanne Mykitiuk "that the Senate of York University confirm that the principles of academic freedom prevail with regard to all academic activities undertaken under the auspices of the university as also expressed by the President of the University, the Chair and Chair-designate of the Board of Governors." Senate of York University, Minutes, June 18, 2009.

Faculty Appointments: Partnerships that involve faculty appointments shall be implemented and governed in accordance with University policies and procedures and provisions of collective agreements for the initial hiring, tenure, promotion, and renewal of meritorious appointees.

Academic Transformation: Partnerships shall be guided by collegiality and timely consultation, particularly when they may have the effect of significantly transforming the academic orientation or make up of a Faculty.

Transparency: All partnership agreements shall be publicly accessible except portions that touch on personal privacy or confidential commercial considerations.

This statement shall be reviewed by Senate Executive in two years to ensure that it remains an effective expression of the academic principles that apply to partnerships.

Policy on Externally Funded Regular Named Chairs (Proposed for Establishment)

Description: This is a Senate and Board of Governors Policy for which there are associated Guidelines and Procedures (See also the Policy on the Establishment and Designation of Research and Teaching Chairs, Professorships and Distinguished Fellowships)

Policy Statement

In furtherance of its academic mandate and out of a desire to provide donors with opportunities to support tenure stream (including alternate stream) faculty members, York University may designate certain regular academic positions as named chairs. Regular named positions differ from Research and Teaching Chairs and Professorships and Distinguished Fellowships by the level of support provided and the expectations associated with the position. They are indistinguishable from other tenure stream faculty positions in all other respects except by virtue of their naming.

Funding

Regular named chairs are established through formal agreements between the University and donors that stipulate the nature and duration of funding and the recognition of donors. In general it is expected that funding will be sufficient to cover at least 50% of the costs of the position either through endowment, or expendable funding sufficient to support at least a five year term of support.

Expectations of Incumbents

Faculty members occupying a regular named Chair are expected to provide an annual report on their activities to their Dean and to the Division of Advancement, which may be shared with donors. They also are also expected to participate in activities that recognize the contribution of donors to the establishment and promotion of the position.

Establishment

The Provost shall review the terms and conditions of all proposals to ensure that they are consistent with York's academic interests and provide the formal approval for the establishment of the naming designation.

Disestablishment

The term or conditions for ending the naming opportunity shall either be provided for at the time of establishment or determined by mutual agreement of the University and donors such that they may be ended following the expiration of a funding term or in the event that endowment income or other funding no longer fully supports the Chair.

Procedures

The Provost is responsible for establishing Regular Named Chairs. See the procedures for the establishment of Distinguished Fellowships in the procedures associated with the Policy on the Establishment and Designation of Research and Teaching Chairs, Professorships and Distinguished Fellowships for further details.