YEATES SCHOOL OF GRADUATE STUDIES (YSGS) REPORT TO SENATE
October 6, 2015

For Senate Approval:

New Graduate Programs

The following programs were reviewed by the Program and Planning Committee (PPC) on September 2, 2015 and forwarded to YSGS Council on September 10, 2015 where they were reviewed and have been recommended for approval by Senate.

1. Child and Youth Care

Motion: *That Senate approve the Master of Child and Youth Care Program.*

2. Biomedical Engineering

Motion: *That Senate approve the Biomedical Engineering Graduate Program.*

3. Mathematical Modelling and Methods

Motion: *That Senate approve the Mathematical Modelling and Methods PhD Program.*

4. Data Science and Analytics

Motion: *That Senate approve the Master of Data Science and Analytics Program.*

5. Engineering Innovation and Entrepreneurship

Motion: *That Senate approve the Master of Engineering Innovation and Entrepreneurship Program.*

New Professional Master's Diplomas

The following programs were reviewed by YSGS Council on May 14, 2015 and have been recommended for approval by Senate. G. Raymond Chang School of Continuing Education has indicated that these programs do not overlap or impinge on any of their operations and do not need to be vetted by them further.

1. Skills for Success for International Students joining Canadian MBA Programs

Motion: *That Senate approve the Skills for Success for International Students joining Canadian MBA Programs PMDip Program.*

2. Chartered Professional Accountant

Motion: *That Senate approve the Chartered Professional Accountant PMDip Program.*

3. Certified Financial Analyst

Motion: *That Senate approve the Certified Financial Analyst PMDip Program.*

4. Finance and Social Innovation

Motion: *That Senate approve the Finance and Social Innovation PMDip Program.*

Submitted by:

Jennifer Mactavish, Dean
Chair, Yeates School of Graduate Studies Council

Dr. John Turtle
Secretary of Senate
Ryerson University
350 Victoria Street
Toronto, ON, M5B 2K3

Dear Dr. Turtle,

Re: New Graduate Program Proposals

The Strategic Mandate Agreement (SMA) lays the foundation for new program development in the graduate school, which will enable us to absorb incremental target growth for the coming year. The first round of new program proposals are:

- Master of Child and Youth Care Program
- Biomedical Engineering Graduate Programs
- Mathematical Modelling and Methods PhD Program
- Master of Data Science and Analytics Program
- Master of Engineering Innovation and Entrepreneurship Program

Program proposals were developed in compliance with Senate policies 110 (Institutional Quality Assurance Process) and 112 (Development of New Graduate and Undergraduate Programs) along with broad consultation and research for viability. Site visits were conducted throughout July 2015 and responses were made shortly after. Full program proposals were reviewed by the Program and Planning Committee (PPC) on September 2nd, 2015 where minor revisions were recommended and they were forwarded to YSGS Council. YSGS Council met on September 10, 2015 where the programs were further reviewed, discussed and then recommended for approval by Senate.

With approval of Senate at the October 6th, 2015 meeting, these proposals can meet the submission deadline established by MTCU of November 2, 2015 and be eligible for funding and OSAP for Fall 2016.

The full program brief is available for review in the office of the Dean of the Yeates School of Graduate Studies (YDI 1118, 1 Dundas West).

Sincerely,

Dr. Jennifer Mactavish
Dean, YSGS

Master of Arts in Child and Youth Care

Faculty of Community Services
Ryerson University

Program Proposal

Proposal amended and prepared in conjunction with the Quality Assurance Framework for submission to Ontario Universities Council on Quality Assurance and Ryerson Senate

September 22, 2015

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1. INTRODUCTION

Currently, the only graduate level child and youth care degree program in Canada is at the University of Victoria in British Columbia. For Eastern Canada, **this is our time to lead** (Academic Plan, 2014-2019)! This program will provide an opportunity for students to obtain a professional degree at the graduate level in their field of practice, and/or to pursue doctoral studies either in the field of child and youth care or in a related field. Graduates from Ryerson's School of Child & Youth Care have long lamented the lack of availability of a graduate program in their own discipline, forcing them to consider alternative disciplines such as Social Work and Education (the most commonly pursued graduate degrees of our graduates). While two or three graduates of our undergraduate program apply to the Masters program at the University of Victoria each year, that program is structured as a two-year program and requires a significant life-style decision and physical relocation on the part of students. Even graduates from undergraduate child and youth care programs offered by universities in BC and Alberta have indicated a desire for choice; this proposed one year Masters program in Child & Youth Care will be of great interest to those students.

The development of this graduate program is the number one priority of the School of Child & Youth Care and was reflected in the School's previous Academic Plan (2008-2013) and is again thus reflected in the School's current Academic Plan (2014-2019) as the number one priority; the demand for graduate education in child and youth care has increased steadily over the past ten years. The undergraduate program of the School has doubled in size since the inception of the four-year program in 2006, with a combined four-year and direct entry intake of 250 students each year. Additional degree granting programs in child and youth care have been or are being developed within Ontario's Community College system, with Humber College graduating its first cohort in spring 2015 (62 graduates). Ten universities across Canada have developed undergraduate degree programs in child and youth care over the past five to ten years (combined 500 graduates per year). The School of Child & Youth Care at Ryerson University is viewed as the leading institution for post-secondary education in this field east of British Columbia, and it is therefore appropriate and indeed, necessary, to once again take the lead in developing the logical next step for post-secondary education in child and youth care practice.

1.1. Objectives of the program

In accordance with Ryerson's Academic Plan and Strategic Objectives and as reflected in the School's Academic Plan, the School of Child & Youth Care is proposing to develop a professional graduate degree level program in child and youth care practice to address the changing needs of the health and human service professional community and its labour market. More succinctly, this proposed graduate program seeks to "challenge the status quo and seek new solutions and apply new ways of thinking that transform the world of young people in particular" (Academic Plan, p.6). Specifically, the School proposes to develop a program that reflects the themes of leadership and innovation in

three core areas of the field: Practice, research and management / policy development. In accordance with Ryerson's commitment to its local community, the proposed program would offer an opportunity to develop leadership skills and education with respect to practice, research and management / policy, taking into account the breadth of ethno-cultural diversity in the GTA and across Ontario. In addition, the proposed program will be aligned with the School's (and the university's) focus on social innovation, and the goal is to provide curriculum and professional training that enables students to present themselves not only as well-trained graduates, but also as social innovators and changemakers.

Learning Outcomes

The specific learning outcomes of the curriculum developed for this program reflect closely Ryerson University's Graduate Degree Level Expectations for Graduate Programs, and in particular these:

- Depth and Breadth of Knowledge
- Research and Scholarship
- Level of Application of Knowledge
- Professional Capacity/Autonomy
- Level of Communication Skills
- Awareness of Limits of Knowledge

Each of the proposed courses within the curriculum, as well as the required field placement and the MRP component, have detailed descriptions of learning outcomes associated with each of these Degree Level Expectations for Graduate Programs. However, beyond these, the program has an overall theme of 'Leadership'; there will be three areas of concentration: leadership in practice, leadership in research, and leadership in management/policy development and analysis. The required courses will provide an advanced foundation for all three areas of concentration, and students can then use their elective course choices, their placement and their MRP as a way of focusing on one of these areas of concentration.

In the context of the theme of Leadership, as defined above, the program has six specific Learning Outcomes:

1. An in-depth understanding of the child and youth care profession, with knowledge and critical perspectives on the historical evolution of the field, current trends, practitioner competencies, and the unique concepts and approaches of child and youth care practices in multiple settings and contexts;
2. Advanced therapeutic, relational and clinical skills as these apply in diverse service settings, and across diverse populations;
3. Capacity to analyze scholarly and grey research literature and its applications to practice, management, policy development, and the further development of field-specific research methodologies;

4. CYC-based advanced practice skills in the context of young people facing adversities, including mental health, dual diagnoses, protection issues, learning issues, social and economic marginalization, or system failures;
5. Understanding of and foundational skills in the area of program and agency management, including CYC approaches to human resource management, financial and budgetary processes, property issues, employer-union relations, and the roles and processes of Boards in the non-profit sector;
6. Engagement with the emerging field of social innovation, its relevance to child and youth care practice, and its focus on inter-professional, inter-disciplinary and public/private partnership and collaboration.

1.2. Admission requirements

The program will have three admission streams as follows, priority ranked as they appear here:

a. Students who have completed a child youth care undergraduate degree at any Canadian University or degree-granting College program, with at least a B average;
b. Students who have completed an undergraduate degree in child and youth studies or family studies at any Canadian University with at least a B average, in combination with a minimum of one year (2080 hours) of professional experience in a child and youth-serving setting;
c. Students who have completed an undergraduate degree in an allied discipline (e.g.: psychology, sociology, early childhood studies, nursing, social work, public administration), with a minimum B average, in combination with a minimum of two years (4160 hours) of professional experience in a child and youth-serving setting.

These admission requirements are appropriate for the learning outcomes of the program. Undergraduate child and youth care degrees involve field placements at all Canadian Universities and degree-granting College programs. Students who have completed such a degree will have both theoretical preparation for advanced studies in child and youth care, and practical experience which will facilitate the application of such theoretical understanding to complex field situations. Students who have completed child and youth studies or family studies programs will have covered similar theoretical material as those who have completed child and youth care degrees, however, they typically would not have had field placement experience as part of their undergraduate studies. Therefore, a professional experience component is necessary. Students with undergraduate degrees in allied fields may or may not have had field experience as part of their undergraduate studies, but even if they did, it would likely not have been focused on young people facing adversity. Therefore, the requirement of two years of professional experience in a child and youth-serving setting ensures readiness for the advanced studies as part of this program, and in particular the

preparedness for leadership roles in practice, management/policy and research contexts.

Alternative requirements / Prior Work or Learning Experiences
All applicants to the program will have to submit three types of non-academic requirements:

a. An updated resume, detailing work experience and any contributions to the field, such as publications, conference presentations, participation in professional groups or activities, etc.;
b. At least two references, of which one must be an Academic reference from a faculty member of the student's undergraduate program, and one must be a professional reference from a supervisor in an employment or field placement context, and, in the case of students without an undergraduate degree in child and youth care, must verify the number of hours worked in a professional child and youth-serving setting;
c. An essay, responding to three themes: Core concepts, issues and themes in child and youth care practice; "My aspirations for leadership in child and youth care practice", and potential MRP interest areas. Each theme must have a response of between 400 and 600 words.

While an undergraduate degree with a minimum B average is the absolute minimum requirement for admission to the program, students with extensive professional experience, particularly in areas that may address issues of diversity and inclusion, will have such experience recognized even if it is not entirely accumulated in paid or professional contexts. This is to recognize that many activities in particularly marginalized contexts do not unfold in professional or institutionalized settings but are nevertheless of enormous value to the field of child and youth care. This provision seeks to ensure opportunities for admission to the program for individuals who meet the minimum academic requirements but have pursued non-traditional ways of involvement in being with young people facing adversity. Applicants who fall into this category may be asked to attend (in person or by phone) an admissions interview so as to provide an opportunity to such applicants to make their case for eligibility.

1.3. Structure

Appropriateness of the Program structure and regulations to meet specified program learning outcomes and degree level expectations.
Given the program's overall objective of producing graduates ready for leadership in the field, focused on one of the core themes (management/policy, practice, research), the program is structured to reflect theoretical learning, applied/practice learning, and research skill building. The required course component of the program provides a strong foundation for advanced understanding of leadership issues in clinical practice, program or organizational management and policy analysis, as well as research and evaluation skills, enriched by a focus on social impact measurement. To this end, the required

courses include one course that provides an advanced exploration of child and youth care theory, one course that focuses on research and social impact metrics, one course that is focused on advanced clinical practice, and one that is focused on leadership in management and policy contexts. The elective component of the program then provides opportunities for students to enrich their study of the particular area of concentration of interest, such as management/policy analysis, practice, or research, with courses offered pursuant to each of these areas of concentration..

The placement component of the program is focused on high-end placements reflecting each of the three areas of concentration. Building on existing partnerships of the School of Child and Youth Care, locally, nationally and internationally, placement will unfold only in accredited, broadly recognized or professionally widely endorsed, settings. For the practice area of concentration, placements will focus on the children's mental health and child welfare sectors, both of which provide high-end clinical training with qualified field supervisors. For the management/policy analysis area of concentration, placements will unfold at the management level of the core sectors in child and youth care, including children's mental health, child welfare, youth justice, and education, or in regional or corporate ministry offices directly concerned with child and youth services in Ontario or some other jurisdiction. Students interested in this area of concentration will be supervised by senior managers/executive directors of agencies/organizations. For the research area of concentration, placements will focus on quality assurance departments and research organizations specifically in the field of child and youth care. This could include quality assurance in Children's Mental Health centres or Child Welfare agencies, research departments in professional associations such as the Ontario Association of Residences Treating Youth or the Ontario Association of Children's Aid Societies, or in Research Institutes based at Universities, such as, for example, the Centre for Children's Rights at Carleton University in Ottawa. Students will complete their placements after all course work has been completed, thus bringing with them high levels of theoretical and contextual understanding.

Finally, the MRP component of the program's structure provides an opportunity for students to apply their learning and articulate their learning outcomes through a well-written 50-page MRP that includes a thorough literature review and can include an original research contribution.

Rationale for Program length that ensures that the program requirements can be reasonably completed within the proposed time period.

The structure of the program (4 required courses + 2 electives, 6-week placement and MRP) corresponds to other professionally-oriented graduate programs in the human services, notably Social Work MSW programs and, at Ryerson University, the inter-disciplinary Immigration and Settlement program. The program is structured as a 12 months full time program (with some part time availability), specifically because employers often are able to accommodate a one-year leave of absence in order for professionals to pursue graduate education. While the intensity of the program will be

high, the structure itself has proven manageable across human service graduate education.

Students will take three courses per Fall and Winter term, which is quite standard in many graduate programs across disciplines. The six-week placement will commence in May and end in mid-June, leaving 2.5 months for the completion of the MRP. The MRP will be started as part of the Research course to be taken in the winter term, with ethics protocol, where applicable, in particular covered as part of that course. MRP supervisors will be in place for each student no later than the end of the winter term, but possibly as early as the beginning of the winter term, so that students will have the opportunity to begin some work on their MRP, typically focused on the literature review component, while completing their placements.

In summery, the program structure is intensive but entirely reasonable and in line with other existing graduate programs.

1.2. Program content

Curriculum and current state of the discipline

Over the course of the past ten years, there have been several major transformations within the systems most closely associated with child and youth care practice. On the initiative of the Ontario Ministry of Children and Youth Services, both the Child Welfare system and the Children's Mental Health system have undergone transformative change from 2005 to 2008 and from 2011 to 2014 respectively. These system transformation initiatives reflect several core trends, including:

- Increasing complexity in the adversity faced by young people;
- A focus on evidence-based and evidence-informed practices throughout the human service systems;
- Large increases in the identification of mental health concerns and suicidal ideation amongst young people generally;
- A move to family-based care and away from institutional care in public systems;
- The rise of significant private-sector initiatives in care provision for children and youth facing adversity;
- A call for cross-system and cross-sector collaboration at all levels of organization and service provision;
- A call of social innovation initiatives that transcend traditional service delivery models;
- A call for leadership, especially within the incoming generation of human service professionals, responding to 'the demographic gap' in leadership across the sector.

One outcome of these trends in the child and youth-serving sectors has been an increasing need for flexible, innovative, skilled, and interdisciplinary professionals. Child

and youth care practitioners have increasingly been called upon to deliver services pursuant to these trends. Their training is inherently interdisciplinary, and their culture of practice is focused on the daily life events of young people facing adversity. Child and youth care professionals are trained to practice within an ecological framework of care that integrates multiple levels of context, including micro-levels (the child, youth or family), macro-levels (systems, organizations and communities) and exo-levels (policy, law, sectors). In addition, child and youth care professional increasingly are able to operate within the ecology of cyber-space, which, in turn, is a rapidly emerging service space for human service agencies (cyber counseling, anti-bullying, mental health apps, etc.).

The curriculum of the Masters program in Child and Youth Care is focused on the overall leadership theme reflecting current trends in the field. The curriculum seeks to not only train child and youth care professionals in practice, management and research context, but provide the foundation for leadership roles in each of these, so that graduates can begin to fill the demographic gap of leadership identified throughout the human services sector. Leadership in this context refers to the specific focus on child and youth care approaches in the delivery of services by multi-disciplinary teams. In this sense, the leadership focus of the curriculum seeks to advance the field of child and youth care by developing leaders who can transcend traditional leadership models and approaches by integrating child and youth care approaches, and in particular a children's rights perspective, as the defining characteristic of leadership in child and youth care settings. Three of the four required courses specifically target the three core areas of concentration within the program: One course on management/policy analysis, designed to prepare students to exercise leadership in the increasingly complex world of cross-sector collaboration, policy alignment, and organizational change processes in response to government-initiated transformation agendas; one course on advanced clinical practice will prepare students to develop child and youth care-focused evidence-based and evidence-informed approaches to practice in line with current demands to deliver on client-level outcomes and broader social impact; and one course focuses on research approaches that are commensurate with the practice of child and youth care, and thus can help to inform the evidence-base of the field in ways that take account of the diversity of stakeholders and issues of inclusion and anti-oppressive practices.

The placement component of the curriculum is particularly important to prepare students "to see" what they learn in the required courses in action. The program aims to ensure that each student completes a placement with the highest level and quality of supervision available, and is able to experience the specific focus of the placement in the context of clinical, policy, management and research trends and approaches.

The MRP component then provides students with the opportunity to apply their learning and articulate their learning outcomes through a well-written 50 page paper that may include an original research contribution.

The elective course component of the curriculum is designed to provide opportunities for students to intensify their study of a particular area of concentration within the program. Electives developed and offered by CYC faculty members, in combination with the electives offered through Early Childhood Studies, Nursing and Social Work, cover core elements of practice and policy contents in the child and youth-serving sectors, with several of these electives explicitly designed to reflect a cross-disciplinary, inter-professional experience, thus mirroring the trends in the field very closely.

Professional Licensing and Accreditation

As a relatively new profession amongst the humans service professions, child and youth care is not yet subject to professional licensing, nor are child and youth care post-secondary programs subject to accreditation processes. However, in nine of ten provinces across Canada, child and youth care is represented through professional associations, most of which are currently actively seeking legislation from their provincial governments in order to institute regulatory frameworks for the profession. In Ontario, the Ontario Association of Child and Youth Care, which has partnered with the School of Child and Youth Care and is co-located on the Ryerson University campus, is imminently putting forward to the Provincial Parliament a request for legislation.

In terms of Accreditation, a national Accreditation Board has been in place for the past five years which is seeking to institute a voluntary accreditation process for post-secondary child and youth care programs, both at the College and the University level. The focus of this initial drive toward accreditation is on College Diploma programs and University undergraduate degree programs. With only one other graduate level degree program in Canada (University of Victoria), standards for the graduate level have not yet been developed.

In spite of the still emerging infrastructure and processes related to licensing and accreditation, the curriculum developed for the Masters program in Child and Youth Care has taken into account the core themes and topics reflected in current discussions related to licensing and accreditation, which include:

- A focus on children's rights, youth empowerment, and youth participation;
- A focus on family-based care, working with families, and promoting family resilience and autonomy;
- Experiential learning opportunities and advanced-level training;
- Properly supervised placement opportunities;
- A focus on ethics and ethical practice;
- A focus on evidence-based practice, research, and innovation.

Unique Curriculum or Program Innovations

A Masters program in Child and Youth Care is in and of itself an innovation. The only other graduate degree program in the field is at the University of Victoria (both MA and Ph.D), where it has successfully been located for 25 years. The curriculum for the Ryerson University program will be unique in several respects:

- The focus on leadership reflects a significant need in the human services fields and advances the field of child and youth care;
- The combination of areas of concentration in advanced clinical practice and management responds to the complexity of organizational structure and cross-sector service delivery priorities;
- The pedagogy of the program will incorporate strong experiential components, including extensive focus on reflective practice, group processes, simulation and group practice, as well as opportunities for in-the-field learning through the six week placement and the research component of the MRP;
- An elective component on cyber-space and online/social media-based therapeutic intervention will be the only one of its kind in the world;
- A strong focus on the use of Self, and Self in relational practice, as a core component of child and youth care practice integrated throughout the curriculum;
- A focus on group work, corresponding to much of the practice context of child and youth care, both with respect to group work with young people, families and colleagues, and also in the context of the student cohort itself.
- An integration of the emergent field of social innovation will be unique to this program, and represent the already well-established expertise in the field by faculty members of the School of Child and Youth Care, and furthermore provides continuity for the recently Senate-approved establishment of the undergraduate minor program in social innovation, also based in the School of Child and Youth Care;
- Pedagogically, both the management and the advanced clinical practice courses will utilize simulation and professional actors as part of the experiential learning experience;
- Placement experiences provide opportunities for field learning not only in clinical practice, but also in research and management, with a focus on organizational change management.

An additional innovation of the program will be a series of workshops available to students in partnership with the Faculty of Community Services' **Community Transformation Café.** These workshops will take place each year three times over the course of the one-year program (November, March and June), and provide intensive learning related to each of the three areas of concentration in the program in an applied format, and reflecting the most current and innovative approaches in the field. The workshops will be delivered jointly by a faculty member of the School of Child and Youth Care and a practice leader in the community, and focus on evidence-based practices in children's mental health (November; to enhance the learning in the required Advanced Clinical Practice course), Current management and leadership issues in child and youth care (March; to enhance the learning in the required Management and Policy Analysis course), and Research Approaches and Social Impact (in June; to enhance the learning in the required Research Methods course and further contribute to the MRP process). These workshops will be open to all graduate and senior undergraduate students in the

Faculty of Community Services, ensuring that the learning represents an inter-professional and inter-disciplinary context. Students participating in the workshops will be awarded with a Certificate of Attendance.

Research Focus

This program is situated at the intersection of professional practice and research, and as such, is not a 'research-focused' program. Nevertheless, the field of child and youth care has an urgent need for greater research capacity at all levels. The required research course, in combination with the MRP with the option of an original research project, will ensure that graduates of this program are research-ready in their employment context.

Graduate Course Requirements

Required Courses: Child and Youth Care Theory
Advanced Clinical Practice in Child and Youth Care
Management and Policy Development in Child and Youth Care
Child and Youth Care Research Methods

Electives (2):

Area of Concentration: Clinical Practice

Supervision in Practice (CYC offered)
On-Line Relational Practice in Child and Youth Care (CYC offered)
Risk and Resilience (ECS offered, CYC developed and taught)
Cross-Cultural Development (ECS offered)
Inclusion: Issues in Assessment (ECS offered)
Advanced Therapeutic Communication (inter-professional course, currently offered by Nursing)

Area of Concentration: Management and Policy Development

Children's Rights in Practice (CYC offered)
Children's Rights (ECS offered)
Critical Perspectives in Child Welfare (Social Work offered)

Area of Concentration: Research Methods

Indigenous Knowledge in Social Work (Social Work offered)
Social Innovation in Child and Youth Care (CYC offered)

Additional Elective Courses:

CS8903 Children Families Communities (ECS offered)
MN8911 Population Health and Health Promotion: Community and Global Perspectives (Nursing offered)
MN 8931 Diversity and Globalization: Promoting Urban Health (Nursing offered)

Field Placement:

All students are required to complete a six-week, full time field placement (216 hours). Placements with an advanced practice focus will be limited to accredited or regulated service settings within Children's Mental Health, Child Welfare, Education, Hospitals or Community. Placements with a research focus will be at large agencies with quality assurance departments, or professional groups with research functions (such as OARTY, OACAS, Centre for Excellence in Children's Mental Health). Placements with either a management or a policy focus will be at regional MCYS offices, or with executive leadership at major agencies in the child and youth serving sectors. The School will work

with placement providers to ensure the highest possible level of supervision and clarity on student roles and learning goals.

Major Research Paper (MRP):

The requirement for MRPs will be a 50-page paper on an approved CYC-focused topic that includes a thorough literature review and may include an original research contribution (which could be a systematic literature review or a small qualitative, quantitative or mixed-methods study). Components of MRP work will be integrated into the Child and Youth Care Research Methods course, so that students seeking to complete a research project involving human research subjects will already have completed substantial elements of their ethics protocols. MRPs will be guided by an assigned supervisor from amongst the RFA faculty members of the School of Child & Youth Care (in some instances, faculty members from other Schools may serve as supervisors), who can be assigned as early as the beginning of the second term. The MRP will be evaluated in writing and through an oral defense by the Supervisor and a Second Reader, who could be a CYC faculty member or any Full or Associate member of the Yeates School of Graduate Studies.

Curriculum in Tabular Format:

Semester	**Course/Program Requirement**
Semester 1 (Fall)	Child and Youth Care Theory (required)
	Advanced Clinical Practice in Child and Youth Care (required)
	Elective (choose one)
Semester 2 (Winter)	Management and Policy Development in Child and Youth Care (required; in-class or on-line))
	Child and Youth Care Research Methods (required; in class or on-line)
	Elective (choose one)
Semester 3 (Spring/Summer)	Field Placement (Late April to mid-June)
	Major Research Paper (completed by late August)

1.5. Mode of delivery

Appropriateness of Mode of Delivery in relation to program learning outcomes and Graduate Degree Level Expectations.

The program will have a residency requirement during the first term only. The envisioned Mode of Delivery is a full time program with in-class course delivery during the first term, in-class and on-line delivery for the second term, and opportunities to complete placement and MRP requirements in Toronto or from a distance. It is likely that some of the highest calibre applicants to the program are more mature students with extensive experience in the field of child and youth care, and potentially employed in senior positions. Therefore, the program may offer admission on a part time basis to a small number of applicants who meet academic eligibility requirements and fit this profile.

Given the focus on leadership, we are particularly focused on two Degree Level Expectations for Graduate Programs: Professional Capacity/Autonomy and Level of Communication Skills. We believe that these two expectations can effectively be met through both in-class and on-line course delivery where professional capacity/autonomy and communication skills can be practiced and enriched on an on-going basis and with the appropriate level of teaching, coaching and guidance. The School has extensive experience with on-line course delivery in its undergraduate program (which, for Direct Entry students, can be completed entirely on-line), and faculty members are well equipped to engage students in experiential and practice-based (simulation-based) learning on-line.

Courses where the pedagogic approach to curriculum delivery will include the use of professional actors will be delivered in class during the first term of the program; this applies in particular to Advanced Clinical Practice.

1.6. Assessment of teaching and learning

i. Appropriateness of Assessment of Student Achievement

Each of the Degree Level Expectations will be assessed in both written and oral formats. Each of the required courses includes assessment components that demonstrate **Depth and Breadth of Knowledge** as well as **Research and Scholarship** through required papers that demonstrate a thorough understanding of the literature and in particular the research literature on child and youth care interventions, the range and the interdependencies of issues, themes and contingencies reflecting the complexities of child and youth adversities, professional leadership and organizational process issues as well as research approaches commensurate with the human service context of child and youth care. An emphasis throughout the curriculum is the development of perspectives on the most recent trends and approaches evident in child and youth serving systems, including the use of evidence-based practices, the role of trauma-informed and strength-based care, as well as the increasing focus on cross-sector and inter-professional team-based work and organizational strategy. Evaluation rubrics for written assignments will therefore be focused on the level of **Application of Knowledge** by assessing student capacity to 'apply existing bodies of knowledge in the critical analysis of new questions or problems/issues in new settings'.

Assessments in each of the courses will also include oral presentations, both individually and in groups, on student-selected issues related to course content, in which students will have to demonstrate high levels of **Professional Capacity/Autonomy** by demonstrating initiative to engage in research and information gathering beyond what is provided in the courses, and by speaking directly to the broader implications of their chosen topic to the relevant context. The oral presentation format of these assessment components also provide opportunities for students to demonstrate their **Levels of**

Communication Skills, and, with respect to their **Research and Scholarship**, the originality in their application of knowledge.

The use of simulation in many of the courses (required and electives) provides an opportunity to further assess students **Professional Capacity/Autonomy** by exploring their ethical behavior in simulated intervention contexts and by demonstrating their capacity to make decisions in complex situations.

Finally, all courses will have a strong focus on the level of student engagement with the materials provided, and extensive readings will provide the basis for in-class participation that will be assessed primarily on the basis of the quality of contributions, with a focus in particular on the students' **Awareness of Limits of Knowledge**, whereby alternative perspectives, methods and disciplinary approaches will be discussed.

The Placement component of the program will be assessed on the basis of feedback from the placement supervisor and the discussions between the faculty advisor, the placement supervisor and the student. Students will prepare a portfolio that clearly provides evidence of their learning in relation to all of the **Graduate Degree Level Expectations**. Placement will be graded on a Pass/Fail basis.

Finally, the MRP component of the program will allow for an assessment of the student's capacity to present a sustained argument in written form, reflecting in particular the **Research and Scholarship** and the **Levels of Communication** expectations. The MRP will be graded on a Pass/Fail basis.

The **Program Learning Outcomes**, as a value-added to the Degree Level Expectations, include the readiness of graduates for employment in leadership-track positions in one of the three areas of concentration for the program: Practice, research or management/policy analysis. For each of these areas, therefore, the assessment of student learning, and also faculty teaching, is focused on the development of leadership competencies, which include:

- Advanced communication skills in written and oral presentation, demonstrating increasing capacity to move from reflection to persuasive argument;

- Innovation in the application of knowledge and research, including capacity to develop practice, research or management approaches reflecting the specificity of child and youth care theory and approaches and that are designed to solve embedded problems or barriers to effective intervention;

- Focus on change-seeking at all levels, including young people, their families and communities, organizations and systems, as well as policy and legislative contexts with a view to embed children's rights, professional ethics and standards of care and practice commensurate with the values of the child and youth care profession.

These **Program Learning Outcomes** will be assessed throughout the curriculum, with assignment rubrics in each course reflecting incrementally higher expectations in relation to these.

ii. Completeness of plans for documenting and demonstrating the level of performance of students

All required and elective courses will utilize a common assessment rubric at base, with additional rubric components added in each course and in relation to each assignment based on the specificity of course content. The common rubric is aligned to the **Graduate Degree Level Expectations** as well as the **Program Learning Outcomes** as follows:

Table 1: Common Assessment Rubric

Graduate Degree Level Expectation	Assignment Expectation	Level 1	Level 2
Depth & Breadth of Knowledge	Topic is presented in systematic form, using peer reviewed, research-based literature and covering a range of contexts, theoretical frameworks and perspectives		
Research & Scholarship	Use of research literature reflects critical evaluation of research designs, methods and implementation		
Level of Application of Knowledge	Clarity of questions asked, knowledge pursued		
Professional Capacity/Autonomy	Discussion of ethics, broader context, and demonstration of professional commitment to the issues, theme or topic; advocacy component embedded		
Level of Communication	APA style, writing format and clarity, persuasiveness of argument (written or oral)		
Awareness of Limits of Knowledge	Clear statement of limitations of approach utilized; indication of alternative approaches, perspectives, methods		
NOTE: Levels 1 and 2 refer to the timing of the assignment in each course. A level 1 rubric is applied to the first assignment in each course, and is focused on the **Degree Level Expectations**; a level 2 rubric is applied for second and third assignments, and incrementally adds a focus on the **Program Learning Outcomes**, and in particular the elements of leadership, change-seeking and innovation.			

iii.) Promotion and graduation requirements

Students must complete all courses with a grade of B- or higher, consistent with the existing graduate policies on grading, promotion and academic standing. The placement and MRP components are graded on a Pass/Fail basis.

All academic standing, promotion and graduation requirements for this program will conform with Policy 142, approved by Senate on May 03, 2011. There are no variations planned for this program.

1.7. Resources for the proposed program

i. Resources for all programs

a. Adequacy of administrative unit's planned utilization of resources

The proposed graduate program will require a 0.5FTE administrative coordinator, which is comparable to other graduate programs with similar enrolment levels. The School currently has 1.0 FTE Administrative Coordinator, 1.0 FTE Program Assistant, and 1.0 FTE Placement Coordinator and Student Advisor. The Administrative Coordinator of the School will oversee all work related to the budgeting and financial aspects of the proposed graduate program, but data entry and regular financial tasks will be carried out by the designated 0.5 FTE Graduate Program Administrative Coordinator. All web site activity related to the proposed Graduate Program will be carried out by the existing 1.0 FTE Program Assistant, who will also represent the Graduate Program Administrative Coordinator during the latter's vacation, sick or leave times. The existing 1.0 FTE Placement Coordinator will take primary responsibility for the placement component of the Graduate Program. The School will endeavour to secure one time funding to hire a student on a short-term contract (six months) prior to the program being launched in order to assist the Placement Coordinator in ensuring that potential placement sites are briefed on learning expectations and are well prepared to receive and provide supervision to our students. The Graduate Program Administrative Coordinator will look after all logistical student needs, course registration, special requests, student funding, the hiring of graduate students as RAs or TAs, and Faculty needs related to the delivery of the Graduate Program components. This position will also ensure that MRP final (post-graded) submissions correspond to standards and are processed as needed.

The addition of the 0.5 FTE Graduate Program Administrative Coordinator was approved during the consultations with and costing of the program through the University Planning Office.

The costing of the program undertaken by the University Planning Office also took into consideration the addition of 1.0 FTE RFA tenure-track faculty member, who will be recruited for the start of the 2016/2017 Academic year. All existing RFA faculty members are members of the Faculty of Graduate Studies, and are

committed to teaching in the Graduate Program as well as to supervising two to three graduate students in their MRP work.

Finally, the School will hire, from its existing complement of RFA faculty members, a Director for the Graduate Program, with course releases as per the appropriate University policies.

In terms of infrastructure, given the relatively small cohort of graduate students, there is no additional space required. The School already has several research office spaces that can be designated as graduate student study/research spaces. The recent addition of student learning space at the new Student Learning Centre further assists with this. With respect to technology, the School already owns several laptops loaded with research software as well as presentation equipment including two projectors that can be signed out to graduate students based on their research needs.

b. Participation of Faculty

The School currently has 8 RFA faculty members, with 7 of these tenured and at the Associate or Full Professor level, and one due for tenure review in 2016. One additional RFA faculty member will be hired, for a total of nine. All faculty members are extremely active in research and on-going innovations in teaching, and all are connected to a wide range of community partners locally, nationally and globally. All faculty members have expressed their commitment to teaching and supervising in the proposed graduate program, and all of the required and elective courses have one faculty member as the course lead, ready to proceed with the full development of the course, including a full course outline based on the course management policy of the Faculty of Graduate Studies.

In addition, the School has three very senior (10 years plus at Ryerson University) Contract lecturers with Ph.Ds that include two very high profile scholars in the field of Child and Youth Care and one emerging scholar in the field. All three have applied for Associate Membership with the Faculty of Graduate Studies, and all three are interested in teaching, co-supervising and acting as second reader for students in their MRP work.

c. University Library

Ryerson University's library has an excellent electronic content collection for the field of child and youth care, including long standing subscriptions to all of the major North American and European peer reviewed journals that are commonly cited in our field. The library also holds all classic works in our field, and additionally all book publications by faculty members from the School. The library furthermore subscribes to relevant journals and professional periodicals from those non-European countries where child and youth care is particularly prevalent, including South Africa, Israel and Australia.

d. Evidence of adequate technology and laboratory resources

The School of Child and Youth Care has a long-standing relationship with the Inter-professional Learning and Training Centre at Ryerson University, and has utilized simulation actors from this centre on an on-going basis for its senior undergraduate courses. We will continue to do so for the graduate courses.

As mentioned, access to mobile technology in the form of laptops and projectors is available to graduate students through the existing holdings of such technology on the part of the School. There are no requirements for special laboratories. Software licenses are in place for all required software for this proposed program.

ii.) Resources for graduate programs

a. Evidence that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation and foster an appropriate intellectual climate.

The faculty members of the School of Child and Youth Care are without exception high profile scholars and professional contributors to the field of child and youth care locally, nationally and globally. Although our RFA faculty group is small, our contributions to field have been very significant. The School itself is recognized in Ontario and beyond as a major space for innovation and knowledge generation in the filed of child and youth care. Our partnerships span all sectors and most themes of the field, including residential services for children and youth, child welfare, children's mental health, education, youth justice, hospital-based care, cyber-space issues, youth engagement, family work, partnership with indigenous communities, social innovation, children's rights, immigration and settlement work, professionalization and regulation, systems change, clinical practice, sexual offending and recidivism, trauma-informed practice, management practices, advocacy and community work.

Many of our RFA faculty members had extensive professional careers before joining the School, including at all levels of organization from direct practice to executive leadership. One of our faculty members, Dr. Judy Finlay, was the longest-serving Provincial Advocate for Children and Youth in Ontario, with an unprecedented tenure of 16 years.

In addition to their individual scholarly and professional achievements of the RFA faculty to be involved in this program, there has also been a significant level of collaboration amongst faculty members of our School. Currently, for example, Dr. Finlay, Dr. Gharabaghi and Dr. Collins are co-applicants and co-investigators on a multi-million dollar project funded by Justice Canada related to "cross-over youth", defined as young people involved simultaneously in child welfare and youth justice. Together they are working with over 30 partners/partner organizations to develop an innovative response

to the unique challenges faced by cross-over youth, along with judges, lawyers, advocates, youth, child protection agencies, school boards, probation, Ministry departments, and others. Dr. Snow, Dr. Collins and Dr. Martin have partnered to develop a unique teaching strategy based on an innovative learning object in the context of children's rights, a project supported by Ryerson University's Teaching and Learning Office. Dr. Hare, Dr. Finlay and Dr. Martin are each contributors to an edited volume entitled "CYC Across Sectors" currently being produced by Dr. Gharabaghi through UBC Press. Dr. Martin and Dr. Collins have each published papers in the international, peer-reviewed journal *Child & Youth Services*, for which Dr. Gharabaghi is the co-Editor in Chief. Dr. Martin is working with Dr. Gharabaghi on the publication of a Special Issue of *Child & Youth Services* related to her current research and work on On-Line Sexual Abuse Images of Children, a project funded by two SSHRC grants. Dr. Snow, Dr. Martin and Dr. Gharabaghi, along with three Contract Lecturers of the School, co-authored a special paper on the field of child and youth care in an online professional publication managed by the International Child and Youth Care Network. Dr. Dunlop and Dr. Finlay have collaborated to develop partnership agreements with indigenous and other academic institutions in New Zealand, where they have travelled together repeatedly, and on one occasion accompanied by Northern Ontario First Nations Community Chiefs.

The School of Child & Youth Care provides an environment of collegial, intellectually stimulating and innovative academic and professional work, with joined projects amongst faculty members and often including contract lectures having become common practice over the past five years.

b. Evidence of Financial Assistance to Students

The School of Child and Youth Care has long lamented the absence of graduate child and youth care students to participate in faculty-led research projects as RAs or to contribute to tutorial teaching or grading activities as TAs. Wherever possible, graduate students in the proposed program will be offered RA/TA assignments that will help to supplement their financial situation. Currently, faculty members have been hiring graduate RAs and TAs from other Schools. We would anticipate that we can offer at least five externally funded RA positions each year, and likely up to another 5 TA positions each year.

c. Supervisory Loads and Appointment Status for Instruction and Supervision

With an initial cohort of 20 students, and an RFA faculty complement of 9 (including the added position considered in the costing of the program by University Planning), the distribution of supervisory loads will be 2 per faculty member, with one or two faculty members taking on three students. Supervision in this context is primarily a factor in relation to the MRP requirement of the program. It is understood that much of the MRP supervision process will unfold over the summer months when faculty members are not typically teaching.

For the purpose of Second Readers for MRP evaluation, RFA faculty members will be available in addition to at least two of our Contract Lecturers who have applied for Associate Status with the Yeates School of Graduate Studies.

The School will furthermore partner with faculty members from allied Schools to serve as supervisors or second readers where student research interests intersect with research agendas of faculty members from other Schools. Given the contributions faculty members from the School of Child & Youth Care have made to the supervision of graduate students in several other Schools, we anticipate that there will be no difficulty in securing at least three or four faculty members from other Schools each year to assist with MRP supervision and/or second reader roles.

All four required courses will be taught by RFA faculty members as follows:

Child and Youth Care Theory	Dr. Gharabaghi
Advanced Clinical Practice	Dr. Finlay/Dr. Martin (alternating)
Management and Policy Development	Dr. Dunlop
Child and Youth Care Research Methods	Dr. Collins

RFA faculty members will teach elective courses taught through the School of Child & Youth Care. In one case, a Contract Lecturer who will be an Associate Member of the School of Graduate Studies and is internationally recognized as the leading scholar on the course's theme, will teach the course.

CYC Supervision in Practice	Dr. Garfat
On-Line Relational Practice in Child and Youth Care	Dr. Martin
Children's Rights in Practice	Dr. Collins
Social Innovation in Child and Youth Care	Dr. Gharabaghi
International CYC Work	Team Taught: Finlay, Gharabaghi, Garfat

Courses offered through other Schools will be taught by faculty members from the other Schools.

d. Estimated number of faculty members and support staff required for steady state program operation

The proposed program requires the availability of at least 4 RFA faculty members to teach at least one course each term, and at minimum 7 RFA faculty members to provide supervision to the MRP work of graduate students in cohorts for 20 with an anticipated steady state of 25 over five years. Given leaves of various kinds, including sabbaticals, as well as occasional work load issues for faculty members involved in major research projects, the continuous availability of these minimum number of faculty members requires a School RFA faculty complement of at minimum nine, with hoped for expansion to 10 over time given not only the addition of the graduate program but also the expansion unfolding in our undergraduate program. The proposed graduate

program was costed by University Planning with an assumption of nine RFA faculty positions, in addition to the costs related to the designation of one of these as Director of the Graduate Program, and the addition of a 0.5FTE administrative staff member.

e. Projected enrolment levels for at least the first five years of the operation of the new program, leading to the intended steady-state enrolment levels and the year in which such steady state will be reached

For the launch academic year 2016/2017, the program envisions enrolment of 20 students. In order for the program to become settled and well functioning with the benefit of accumulated experience, this 20-student cohort each Fall will remain in place for a period of five years (2021/2022). It is hoped that at the end of this five-year period, an increased cohort of 25 students can then be admitted in the Fall of 2022 for steady-state operations.

f. Tuition proposal for graduate programs

We propose that the tuition fees for this program be set at the same level as tuition fees for the MA program in Early Childhood Studies and the Master of Social Work program. There are no special tuition fee requirements or added fees necessary.

1.8. Quality and other indicators

In this section are definitions and use of indicators that provide evidence of quality of faculty (eg: qualifications, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program).

Indicator: Ph.D (faculty members hold Ph.Ds in child and youth care-related fields)

The School requires all tenure-track and tenured faculty to hold Ph.Ds in one of the fields related to the foundations of the three areas of concentration built into the proposed Masters program in Child & Youth Care. The current faculty members hold Ph.Ds in Social Work (x3), Psychology (x3), Politics and Law (x2), and Education (x1).

Indicator: Community involvement (faculty members work in partnership with community agencies and government locally and globally)

In addition, the School requires faculty members to demonstrate current activity in the field of Child and Youth Care, including active community partnerships locally and globally. Indeed, all faculty members have long histories of professional and research involvement in the field.

Indicator: Breadth of Expertise (faculty members are engaged in a wide range of child and youth care sectors)

The combined expertise of the faculty covers all of the major practice sectors of child and youth care, and certainly all three areas of concentration of the proposed Masters program in Child & Youth Care. Dr. Finlay, Dr. Martin and Dr. Langton are active researchers in clinical practice areas, and all three have

clinical practice experience in the field. Dr. Snow is involved in clinical practice as her ongoing work, and Dr. Gharabaghi, Dr. Collins and Dr. Dunlop have extensive experience in management, policy development and related practices.

Indicator: Research (faculty members are engaged in externally funded research activities)

All faculty members have extensive research experience, and are currently working on externally funded research projects, including a total of five SSHRC-funded projects.

The proposed program is designed as an intensive experience exploring leadership in the child and youth care field. The required course work ensures that all students are provided with a strong foundation in all three areas of concentration offered by the program, with the Child and Youth Care Theory course providing a cohesive theoretical framework and perspective for further learning. The elective courses offered will allow students to pursue their specific interests further and to engage more deeply one of the areas of concentration. The placement component will ensure that students have opportunities for field-based learning at the highest possible levels, and the MRP component will provide student with an opportunity to produce their own original work pursuant to a topic of their interest.

Given the very active research agendas of faculty members, graduate students will have ample opportunity to become involved in a wide range of projects and activities that will enhance their learning experience and potentially also their professional opportunities upon graduation.

APPENDICES

A. Institutional Response to the External Reviewer(s)' Report

Yeates School of Graduate Studies

Response from YSGS on the
Site Team Report for the proposed Masters
in Child and Youth Care Degree Program
Dr. Jennifer Mactavish, Dean YSGS
Dr. Anthony Bonato, Associate Dean YSGS

The site team for the proposed Child and Youth Care (CYC) Masters program consisted of Dr. Doug Magnuson (University of Victoria) and Dr. Varda Mann-Feder (Concordia University) The site visit was conducted on June 23, 2015. The site team report was communicated to the Associate Dean, YSGS on July 9, 2015, and the response to the report from CYC was communicated on July 28, 2015.

The site team highlighted several strengths of the proposed program, including the focus on advanced practice, the emphasis on goals and practices that are strengths of the current faculty, and focus on goals that are consistent with the needs of the field in Ontario and Canada. Several recommendations were made to improve the proposal, and these are outlined below.

As mandated by Ryerson Senate Policy 112, what follows is the YSGS-level response to the site team report, and the response to the report of CYC. We summarize below the recommendations and responses. For simplicity, we supply our responses (as well as a recap of the site team recommendations and CYC responses) in the form of tables.

Recommendation	**CYC response**	**YSGS response**
Recommendation 1: Allow for on-line and part-time registration in the program.	The reviewers point out that some of the most qualified candidates for the program will likely be individuals currently employed in child and youth services who may not be able to commit to a one year residency in Toronto. As the original proposal stated, it was always the School's aspiration to offer the program at least in part through on-line and part-time options. Therefore, we have integrated on-line and part-time options directly into the proposal, and have accordingly made some nuanced changes in the section that addresses Course Delivery Mode.	We support the move towards incorporating on-line content and part-time registration into the program, as this will serve to widen the pool of potential applicants.
Recommendation 2:	The School agrees that clear and optimized admission criteria are	YSGS will work with CYC to determined optimal admission

Ensure admission criteria attract the best possible students, ideally by prioritizing students with undergraduate degrees in child and youth care.	essential. To this end, we have clarified that our admission streams are rank ordered, whereby clear preference will be given to students with undergraduate degrees in Child and Youth Care. Moreover, in line with a secondary recommendation of the reviewers, we have now specified that students must have completed a research methods course as part of their undergraduate curriculum. A brief survey across undergraduate child and youth care degree programs in Canada indicates that almost every such program does in fact require students to complete a research methods course.	criteria. We support the preference to take students with prior educational experience in the Child and Youth Care area.
Recommendation 3: Clarify experiential learning and leadership concepts.	The reviewers had questions about what is meant by the overall theme of leadership, and how experiential learning will be integrated into the curriculum. The reviewers were, however, highly satisfied with the explanations provided during their site visit. To this end, we have added some language in the proposal to clarify the meaning of these concepts in the context of our proposed Masters program. The concept of leadership is now described in greater detail, and the concept of experiential learning is clarified using in particular the two sub-recommendations of the reviewers, namely greater emphasis on the concept of Self and group work. We have provided nuanced language to ensure that these concepts are more effectively integrated into the overall curriculum.	YSGS supports the CYC response, and the additional language provided by CYC strengthens the proposal.
Recommendation 4 Clarify the 'streams' cited within the proposal.	We have eliminated all references to "streams' and have replaced these with the term "area of concentration". We have furthermore clarified that students must take the required courses for each of the three areas of concentration, and can then utilize their electives, placement and MRP to focus on an area of concentration of particular interest to them. Furthermore, we have clarified that these areas of concentration are presented to assist students in choosing a thematically coherent curriculum pathway, but there are no specific requirements associated with these.	YSGS supports the CYC response.

Recommendation 5 Reduce focus on content learning.	The reviewers indicate that the planned curriculum is highly ambitious and may be overly challenging for a one-year program. The School's perspective is that this is not so; the School's goal is to ensure an academically rigorous but professionally highly relevant curriculum. Ryerson University's experiences with similarly structured Masters programs in Social Work and in Immigration and Settlement have demonstrated the viability of this approach. Clearly, much is expected of students within our proposed program, and the School feels that this is rightly so. It is furthermore important to note that as the only graduate degree program in Child & Youth Care in Ontario, employers and the field at large will want to see significant content within the curriculum that matches the increasing complexity of the child and youth serving fields. Therefore, with due respect to the reviewers perspective, we have not made adjustments to the content areas of the program.	While we support the CYC response, we suggest that the content be viewed critically, especially in the first few years of the program, to determine the correct balance with breadth and academic rigor.
Recommendation 6 Invest up front in designing the placement components such that placements provide meaningful supervision to students and also that roles of students are clear in terms of learning objectives.	In response to this recommendation, we agree that an upfront investment to ensure excellence in the placement experience is appropriate. We therefore will endeavor to secure one-time funding to hire someone to assist our Placement coordinator with communication with placement sites specifically to develop plans for supervisor assignments and protocols for ensuring the learning objective are met. It should be pointed out, however, that the School already has excellent placement partners and much work has been done to communicate our plans related to this Masters program to potential graduate placement sites. The School is very confident that this component of the program will be an excellent experience for students.	YSGS supports the program level response. The placement components are important pieces of the CYC program.
Recommendation 7: Align research course with experiential learning strategies.	The required research course is designed to assist students in their engagement of research methods and research-based literature, while at the same time, providing the necessary skills and competencies to complete a small-scale research project as part of their MRP.	YSGS supports the program level response.

	Therefore, while the course offers some content-based learning related to child and youth care research methods, it is fundamentally focused on the individualized MRP interests of students, and where possible, will serve as a foundation for student research projects particularly in the context of research ethics.	

In conclusion, we thank the external reviewers and colleagues in CYC for a very thorough assessment of the strengths and challenges of the proposed program. The site visit team's recommendations and CYC's responses raise important points regarding the program, and the discussion of these will only have a positive development in the evolution of the program.

Graduate Program in Biomedical Engineering

Faculty of Engineering and Architectural Science
Ryerson University

Program Proposal

Proposal amended and prepared in conjunction with the Quality Assurance Framework for submission to Ontario Universities Council on Quality Assurance and Ryerson Senate

September 22, 2015

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1. INTRODUCTION

1.0. Executive Summary

The Faculty of Engineering and Architectural Science (FEAS) at Ryerson University is proposing a new Graduate Program in Biomedical Engineering to begin in the Fall semester of 2016. The program will attract recent graduates from engineering and biomedical sciences or experienced biomedical industry professionals and allied areas. The main objectives of the proposed program are to: (i) educate the biomedical engineers of tomorrow by offering specialized interdisciplinary education, (ii) formally link graduate education in biomedical engineering currently conducted in FEAS, and (iii) develop cohesiveness amongst biomedical engineering graduate students and faculty members to increase the competitiveness of Ryerson University at the national and international levels. The program will prepare students for careers in the biomedical engineering industry and related areas. Unlike many other engineering specialties, advanced education and research training in this field is becoming necessary as approximately one-third of current employees in the biomedical engineering sector have post-graduate degrees. Similarly, the program will also prepare students for the pursuit of higher post-graduate education.

The program consists of both coursework and graduate research. The coursework component is a combination of both Foundation and Elective courses to provide the fundamentals in biomedical engineering as well as research-specific instruction, respectively. Graduate research is conducted within the three primary research areas of: biomaterials, biomechanics, and biomedical signals and systems. This program is uniquely designed to build on Ryerson's engineering research strengths, the latest in teaching methodologies, and the hands on experiential learning foundation.

Students in the program will have the opportunity to advance their own research, tap into Ryerson University's leading faculty-based research or work on biomedical industry-identified projects. Throughout the interdisciplinary program, students will be supported by a strong network of experienced faculty supervisors as well as have the unique opportunity for internship and training at surrounding research hospitals (St. Michael's Hospital and University Health Network). The program will support student development in research and development in biomedical engineering — ranked as the #1 job in the health care industry — to meet the increasing demand for better medical devices and tools, more sophisticated medical equipment, and improved biomedical procedures.

1.1. Objectives of the program

Appropriateness of Degree Nomenclature

It is appropriate that graduate program in biomedical engineering have both a Master's and PhD degree offerings given the program's focus on specialized instruction and

independent research in biomedical engineering. Program level learning outcomes and degree level expectations are commensurate with these degree offerings. Similarly, research-focused biomedical engineering programs offered through other institutions award degrees at either, or both, the Master's and PhD level (based on the extent and scope of the student's research).

Relation to Ryerson's Academic Plan

New and innovative curricula and program structures, in particular interdisciplinary programs, are encouraged in the academic plan[1]. Ryerson has made a commitment to strength graduate education and enable the strategic expansion of master's and doctoral programs to meet demand for highly qualified personnel in the private, public and not-for-profit sectors. The new graduate program proposal is also consistent to provide stronger linkages between education and research to engage students and support greater SRC intensity, benefitting the university as a whole. Such growth can be realized by introducing new graduate programs in the strategic areas. As graduate growth remains the university priority, it is one of the university priorities to continue graduate program development.

More explicitly, the proposed graduate program is consistent with, and in support of, the following priorities outlined within Ryerson's academic plan[1]:

> *Graduate Education*
> The university puts a high priority for continuing to develop graduate programs (Strategy 16), especially those of an interdisciplinary nature (such as biomedical engineering). Such programs will intensify SRC activities by having more focused research and engaged graduate students, improve experiential learning, and provide opportunities for partnerships with government, business, industry and community-based agencies. Relevant to the proposed program is the university's research partnerships with leading institutions, such as St. Michael's Hospital. This in turn will improve opportunities for learning, research and innovation for the graduate students. The proposed graduate program will serve to help attract top graduate students due to the availability and quality of mentorship of the program's experienced faculty base (Strategy 14).
>
> *Student Engagement*
> The academic plan places a priority on enabling greater student engagement. The introduction of a new graduate program in biomedical engineering will have a positive impact on student engagement by providing further interdisciplinary education, experiential learning, and research opportunities for graduate students (Strategies 4 and 5).

[1] Ryerson University (2014). Our Time to Lead: Academic Plan for 2014-2019. Office of the Provost and Vice *President Academic. Available from http://www.ryerson.ca/provost/planning.*

Teaching and Learning
The proposed program in biomedical engineering supports the incorporation of faculty SRC activity into both classroom learning as well as providing greater opportunities for graduate student involvement with research (Strategy 12). Faculty research is explicitly interwoven throughout the program and is incorporated in both its graduate course offerings and research-based requirement of the program.

SRC Intensity
The proposed program aims at creating a more organized research cluster and intensified cross-disciplinary research activity in biomedical engineering (Strategy 20). This, in turn, will increase collaborative efforts of the faculty and serve to expand SRC partnerships and sponsored research with industry and other academic institutions (Strategy 19) resulting in the long-term success and sustainability of a robust SRC culture within Ryerson. Similarly, the proposed program will also foster excellence in graduate studies in order to attract at retain high-quality students.

The proposed program is in strong correlation with the strategic areas of research activities that have been identified, and include "*health and well-being*," and "*technological innovation*."

Program Level Learning Outcomes

The mission of the Graduate Program in Biomedical Engineering is to provide the highest standards in student education and research in the area of biomedical engineering. The interdisciplinary character of biomedical engineering and operation of the program offers unique opportunities to fulfill this mission. The educational mission is served by capitalizing on the expertise of faculty from diverse disciplines to develop a curriculum focusing on the application of engineering principles to medicine and biology. The research mission is to encourage and support collaborative research designed to produce new knowledge about fundamental mechanisms in the life sciences and to provide new knowledge for improving health care through the development of innovative medical technology.

The graduate program encompasses a wide variety of theoretical and applied studies and activities with program-level learning outcomes that are designed for training of students according to the Graduate Degree Expectations (GDLEs) developed by the Ontario Council of Graduate Studies. These learning outcomes (Tables 1-3 for each degree program) have been developed by the existing faculty members of the department who are experts in various core and interdisciplinary areas of biomedical engineering.

Table 1: MEng Degree Level Expectations

MEng Degree Level Expectations Based on the Ontario Council of Academic Vice-Presidents DLEs	MEng Program Learning Objectives And Outcomes	How the Program Design Supports the Attainment of Student Learning Outcomes
EXPECTATIONS. This MEng in Biomedical Engineering is awarded to students who have demonstrated:		
1. Depth and Breadth of Knowledge A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of the academic discipline, field of study, or area of professional practice.	Depth of knowledge is demonstrated for MEng students by the ability to undertake a research project (if applicable) in one of the 3 fields of the biomedical engineering program. Breadth of knowledge is demonstrated for MEng students by a fluency in both biomedical sciences and engineering disciplines. This is reflected in students who are able to develop and apply interdisciplinary skills that span biological sciences and the engineering disciplines to design, develop and implement biomedical technologies for improving health care.	Depth and breadth of knowledge obtained through the successful completion of coursework requirement (8 graduate level courses and research project or 10 graduate level courses), including the following mandatory components: • BE8001 Foundations of BME • BE8002 Seminars in BME • BP8114 Anatomy & Physiology Students will also acquire broad exposure to the field of biomedical engineering through the following organized events: • Annual research day events. • Annual iBEST Symposium Successful completion of research project (if applicable).
2. Research and Scholarship A conceptual understanding and methodological competence that i) Enables a working comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in the discipline; ii) enables a critical evaluation of current research and advanced research and scholarship in the discipline or area of professional competence; and iii) Enables a treatment of complex issues and judgments based on established principles and techniques; and, on the basis of that competence, has shown at least one of the following: i) The development and support of a sustained argument in	Research and Scholarship is demonstrated for MEng students by the comprehension of how research and inquiry techniques are used to: create knowledge in the discipline, critically evaluate research and scholarship in the discipline, and treat complex issues based on established principles. This is reflected in students who are able to: articulate a clear hypothesis or an overall goal for their research project (if applicable), acquire a familiarity with the relevant literature and concepts, interpret experimental data/outcomes, and appreciate the limitations of the approaches used.	Conceptual understanding and methodological competence obtained through their research project work (if applicable). Development and support of a sustained argument, and originality in the application scientific knowledge in biomedical sciences and engineering through their coursework requirements and written project (if applicable). Development and support of a sustained argument in verbal form through their participation in graduate seminar course (BE8002 Seminars in BME).

written form; or ii) Originality in the application of knowledge.		
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.	Application of knowledge is reflected in students who are able to achieve a level of competence beyond that of the undergraduate level. For their MEng research project, students are able to apply an existing body of knowledge in the critical analysis of a new question or of a specific biomedical problem, and the ability to exercise leadership in research innovation.	Level and application of knowledge obtained through the successful completion of coursework requirement and execution of independent research project (if applicable).
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.	Professional Capacity/Autonomy is defined as personal responsibility, accountability, complex decision making skills, intellectual independence, and academic integrity. This is reflected in students who are able to conduct independent research and complete a MEng research project.	Professional capacity obtained through the successful completion of coursework which involves practice in the areas of personal responsibility, accountability, complex decision making skills, intellectual independence, biomedical ethics, and academic integrity (e.g. BE8001 Foundations of BME). Leadership skills obtained through team projects as part of their coursework, execution of their independent research project (if applicable), and (mandatory) completion of BE8001 Foundations of BME. Autonomy demonstrated by determining specific sub-problems, strategies and methodologies for completing their independent MEng project (if applicable).
5. Level of Communications Skills The ability to communicate ideas, issues and conclusions clearly.	Communication skills are reflected in students who are able to effectively present research in such a way that it is easily understood, encourages discussion, promotes participation, and encourages collaboration in research through verbal, written and other non-verbal means of communication.	Communication skills obtained through research presentations at the graduate seminar course (BE8002 Seminars in BME), annual research day events, and to their supervisory committee. Students will also be provided with the opportunity to present their research at conferences/workshops as well as participate in teaching undergraduate

		curriculum through teaching assistantships during the course of their graduate program.
6. Awareness of Limits of Knowledge Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.	The ability to understand the limitations of scholarship and research and the boundaries of present-day understanding through coursework requirements and independent MEng research project.	Awareness of limits of knowledge obtained through successful completion of coursework, annual assessment of graduate student performance and attendance and participation in the graduate seminar course (BE8002 Seminars in BME). Students will also become aware of how to measure their knowledge base relative to the field through attendance at local, national and international conferences/workshops.

Table 2: MASc Degree Level Expectations

MASc Degree Level Expectations Based on the Ontario Council of Academic Vice-Presidents DLEs	MASc Program Learning Objectives And Outcomes	How the Program Design Supports the Attainment of Student Learning Outcomes
EXPECTATIONS. This MASc in Biomedical Engineering is awarded to students who have demonstrated:		
1. Depth and Breadth of Knowledge A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of the academic discipline, field of study, or area of professional practice.	Depth of knowledge is demonstrated for MASc students by the ability to undertake a research-based thesis in one of the 3 fields of the biomedical engineering program. Breadth of knowledge is demonstrated for MASc students by a fluency in both biomedical sciences and engineering disciplines. This is reflected in students who are able to develop and apply interdisciplinary skills that span biological sciences and the engineering disciplines to design, develop and implement biomedical technologies for improving health care.	Depth and breadth of knowledge obtained through the successful completion of coursework requirement (5 graduate level courses), including the following mandatory components: • BE8001 Foundations of BME • BE8002 Seminars in BME • BP8114 Anatomy & Physiology Students will also acquire broad exposure to the field of biomedical engineering through the following organized events: • Annual research day events. • Annual iBEST Symposium Successful completion and defence of research-based thesis.
2. Research and Scholarship A conceptual understanding and	Research and Scholarship is demonstrated for MASc students by the comprehension of how research	Conceptual understanding and methodological competence obtained through their research-based thesis

methodological competence that i) Enables a working comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in the discipline; ii) enables a critical evaluation of current research and advanced research and scholarship in the discipline or area of professional competence; and iii) Enables a treatment of complex issues and judgments based on established principles and techniques; and, on the basis of that competence, has shown at least one of the following: i) The development and support of a sustained argument in written form; or ii) Originality in the application of knowledge.	and inquiry techniques are used to: create knowledge in the discipline, critically evaluate research and scholarship in the discipline, and treat complex issues based on established principles. This is reflected in students who are able to: articulate a clear hypothesis or an overall goal for their Master's research project, acquire a familiarity with the relevant literature and concepts, interpret experimental data/outcomes, and appreciate the limitations of the approaches used.	work. Development and support of a sustained argument, and originality in the application scientific knowledge in biomedical sciences and engineering through their written thesis. Development and support of a sustained argument in verbal form through their oral examination.
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.	Application of knowledge is reflected in students who are able to achieve a level of competence beyond that of the undergraduate level. For their MASc research thesis, students are able to apply an existing body of knowledge in the critical analysis of a new question or of a specific biomedical problem, and the ability to exercise leadership in research innovation.	Level and application of knowledge obtained through the successful completion of coursework requirement, execution of independent research, and successful completion of research thesis as determined by the examination committee.
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	Professional Capacity/Autonomy is defined as personal responsibility, accountability, complex decision making skills, intellectual independence, and academic integrity. This is reflected in students who are able to conduct independent research and complete a MASc research thesis.	Professional capacity obtained through the successful completion of coursework which involves practice in the areas of personal responsibility, accountability, complex decision making skills, intellectual independence, biomedical ethics, and academic integrity (e.g. BE8001 Foundations of BME). Leadership skills obtained through team projects as part of their coursework, execution of their independent research-based thesis, and (mandatory) completion of BE8001 Foundations of BME. Autonomy demonstrated by determining specific sub-problems, strategies and methodologies for completing their independent MASc

knowledge to particular contexts.		thesis.
5. Level of Communications Skills The ability to communicate ideas, issues and conclusions clearly.	Communication skills are reflected in students who are able to effectively present research in such a way that it is easily understood, encourages discussion, promotes participation, and encourages collaboration in research through verbal, written and other non-verbal means of communication.	Communication skills obtained through research presentations at the graduate seminar course (BE8002 Seminars in BME), annual research day events, and to their supervisory committee. Students will also be provided with the opportunity to present their research at conferences/workshops as well as participate in teaching undergraduate curriculum through teaching assistantships during the course of their graduate program.
6. Awareness of Limits of Knowledge Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.	The ability to understand the limitations of scholarship and research and the boundaries of present-day understanding through coursework requirements and independent MASc research.	Awareness of limits of knowledge obtained through successful completion of coursework, annual assessment of graduate student performance, attendance and participation in the graduate seminar course (BE8002 Seminars in BME), supervisory committee meetings, and oral thesis defense. Students will also become aware of how to measure their knowledge base relative to the field through attendance at local, national and international conferences/workshops.

Table 3: PhD Degree Level Expectations

PhD Degree Level Expectations Based on the Ontario Council of Academic Vice-Presidents DLEs	PhD Program Learning Objectives And Outcomes	How the Program Design Supports the Attainment of Student Learning Outcomes
EXPECTATIONS. This PhD in Biomedical Engineering extends the skills associated with the MASc degree and is awarded to students who have demonstrated:		
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	Great depth of knowledge is demonstrated for PhD students by the ability to undertake a research-based thesis in one of the 3 fields of the biomedical engineering program.	Depth and breadth of knowledge obtained through the successful completion of coursework requirement (4 graduate level courses), including the following

practice.	Breadth of knowledge is demonstrated for PhD students by a fluency in both biomedical sciences and engineering disciplines. This is reflected in students who are able to develop and apply advanced interdisciplinary skills that span biological sciences and the engineering disciplines to design, develop and implement cutting-edge biomedical technologies for improving health care.	mandatory components: • BE8001 Foundations of BME • BE8002 Seminars in BME • BP8114 Anatomy & Physiology Students will also acquire broad exposure to the field of biomedical engineering through the following organized events: • Annual research day events. • Annual iBEST Symposium Successful completion and defence of research-based dissertation.
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. c. The ability to produce original research, or other advanced scholarship, of a quality to satisfy peer review, and to merit publication.	Research and Scholarship is demonstrated for PhD students by the comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in the discipline, critical evaluation of current research and advanced research and scholarship in the discipline, and treatment of complex issues and judgments based on established principles and techniques. On the basis of that competence and through their dissertation, PhD students further demonstrate the development and support of a sustained argument in written form, and originality in the application scientific knowledge. This is reflected in students who are able to: articulate a clear hypothesis or an overall goal for their PhD research project, plan and design critical experiments to prove or disprove hypotheses or to achieve the overall goal stated in their PhD proposal, acquire in depth knowledge of the relevant literature and concepts relevant to their PhD project, interpret experimental data/outcomes, and appreciate the limitations of the approaches used.	Conceptual understanding and methodological competence obtained through their PhD research-based thesis work which enables a number of abilities. These abilities are evaluated by the supervisory committee meetings, PhD qualifying examinations, and PhD oral examination.
3. Level of Application of Knowledge The capacity to i) Undertake pure and/or applied research at an advanced level; and ii) Contribute to	Application of knowledge is reflected in students who are able to achieve a level of competence beyond that of the undergraduate	Level and application of knowledge obtained through the successful completion of coursework requirement, conception and execution of independent research,

the development of academic or professional skills, techniques, tools, practices, ideas, theories, approaches, and/or materials.	level. For their PhD research thesis, students demonstrate competency in the research process by applying an existing body of knowledge in the critical analysis of a new question or of a specific biomedical problem, and the ability to exercise leadership in research innovation. This is reflected in students who are able to plan and execute an original and conclusive scientific investigation that develops into a full PhD thesis (ideally publication of three peer reviewed first-author papers).	successful completion of PhD qualifying examinations, rigor of supervisory committee meetings, and successful completion of research dissertation as determined by the examination committee.
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. d. The ability to evaluate the broader implications of applying knowledge to particular contexts.	Professional Capacity/Autonomy is defined as personal responsibility, accountability, complex decision making skills, intellectual independence, and academic integrity. This is reflected in students who are able to conduct independent research and complete a PhD research dissertation.	Professional capacity obtained through the successful completion of coursework which involves practice in the areas of personal responsibility, accountability, complex decision making skills, intellectual independence, biomedical ethics, and academic integrity (e.g. BE8001 Foundations of BME). Leadership skills obtained through team projects as part of their coursework, execution of their independent research-based thesis, and (mandatory) completion of BE8001 Foundations of BME. Autonomy demonstrated by determining specific sub-problems, strategies and methodologies for completing their independent PhD thesis.
5. Level of Communications Skills The ability to communicate complex and/or ambiguous ideas, issues and conclusions clearly and effectively.	Communication skills are reflected in students who are able to effectively present research in such a way that it is easily understood, encourages discussion, promotes participation, and encourages collaboration in research through verbal, written and other non-verbal means of communication. PhD students must also be able to articulate a clear hypothesis or a clear overall goal for their PhD	Communication skills obtained through research presentations at the graduate seminar course (BE8002 Seminars in BME), annual research day events, and to their supervisory committee. Students will also be provided with the opportunity to present their research at conferences/workshops as well as participate in teaching undergraduate curriculum through teaching assistantships during the

	research project, prepare a PhD project proposal, pass PhD qualifying examinations, and participate in publication of research results in formal venues, as well as presentations at conferences and workshops.	course of their graduate program.
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. 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.	The ability to understand the limitations of scholarship and research and the boundaries of present-day understanding through coursework requirements and independent PhD research.	Awareness of limits of knowledge obtained through successful completion of coursework, annual assessment of graduate student performance, attendance and participation in the graduate seminar course (BE8002 Seminars in BME), PhD qualifying examinations, supervisory committee meetings, and PhD oral thesis defense. Students will also become aware of how to measure their knowledge base relative to the field through attendance at local, national and international conferences/workshops.

1.2. Admission requirements

MEng Admission Requirements

Candidates applying to the MEng program in biomedical engineering need to have completed at least a four-year undergraduate degree in engineering, or a related field in the biomedical sciences, from a recognized institution. As with MEng programs in the Faculty of Engineering & Architectural Sciences, candidates must have a minimum grade point average (GPA) or equivalent of 3.00/4.33 (B) in their final two years in courses within the disciplines of engineering and/or biomedical sciences (e.g. biology, biochemistry, physiology, immunology, genetics, etc.), in which the applicant proposes to do graduate work.

MASc Admission Requirements

Candidates applying to the MASc program in biomedical engineering need to have completed at least a four-year undergraduate degree in engineering, or a related field in the biomedical sciences, from a recognized institution. As with MASc programs in the Faculty of Engineering & Architectural Sciences, candidates must have a minimum grade point average (GPA) or equivalent of 3.33/4.33 (B+) in their final two years in courses within the disciplines of engineering and/or biomedical sciences (e.g. biology, biochemistry, physiology, immunology, genetics, etc.), in which the applicant proposes to do graduate work. Admission will also only be granted to students when funding is available and a faculty member within the program is willing to supervise their research project.

PhD Admission Requirements

Candidates applying to the PhD program in biomedical engineering need to have a demonstrated capacity to undertake advanced research though the completion of a Master's degree in biomedical engineering, or a related field in either engineering or biomedical sciences (e.g. biology, biochemistry, physiology, immunology, genetics, etc.), from a recognized institution. As with PhD programs in the Faculty of Engineering & Architectural Sciences, candidates must have a minimum cumulative grade point average (CGPA) or equivalent of 3.33/4.33 (B+) during their Master's degree program. Admission will also only be granted to students when funding is available and a faculty member within the program is willing to supervise their research project.

Advanced Standing

Prospective students PhD students applying to the program with a prior graduate degree in biomedical engineering may be granted admittance with "Advanced Standing". Advanced Standing designation consists of a reduction of up to two (2) courses in the coursework requirement of their. Admittance with Advanced Standing recommendations will be made by the program Admissions and Scholarship Committee.

Additional Considerations Regarding Admission

Strong academic performance and research potential is a critical requirement for admission. As such, two letters of recommendation will also be required attesting to the applicant's proficiency and potential to engage in graduate level work. Foreign visa students will also be required to demonstrate English language proficiency, as stipulated by the Yeates School of Graduate Studies.

The program also values appropriate work experience. Therefore, prospective applicants who did not attain the required standing in their undergraduate degree, but who have at least four (4) years of relevant biomedical engineering work experience, should discuss their situation with the Graduate Program Director (GPD). If the experience is deemed sufficient, the coordinator may then recommend admittance into the program upon approval by the Admissions and Scholarship Committee. Evidence of ability and potential to engage in graduate level work and research will still be required.

Students can be admitted in September (MEng, MASc, PhD) and January (Domestic PhD only). Students will be eligible for internal scholarships based on the following criteria: academic standing; research potential, and leadership, which will be determined by the Admissions and Scholarship Committee.

1.3. Program Structure and Content

Curriculum Overview

The Graduate Program in Biomedical Engineering is an interdisciplinary program between the departments of Chemical Engineering, Electrical & Computer Engineering, and Mechanical & Industrial Engineering within the Faculty of Engineering &

Architectural Sciences (FEAS) at Ryerson University. The main innovative feature of this program is neither its concept nor its content (as there are many other similar programs in North America), but its functional design. The proposed program has been developed by the goodwill, combined strength, coordinated efforts, and joint administration of the contributing departments within FEAS. Another innovative feature of the proposed program is its admission's flexibility: the program will admit students from a wide variety of backgrounds, and tailor each student's program by taking their particular background into account. This results in a flexible, *student-centered* biomedical engineering program that meets the objectives of the degree and the institution.

The main research areas of the graduate program includes, but is not limited to, the three main focus areas of: (i) biomaterials, (ii) biomechanics, and (iii) biomedical signals and systems. This program is uniquely designed to build on Ryerson's engineering research strengths, the latest in teaching methodologies, and the hands on experiential learning foundation.

The curriculum of the program is similar to other graduate engineering programs and contains both coursework and research components. A unique feature of this proposed program is that students are required to take a series of Foundation courses to properly prepare students on how to engage in, plan, conduct, and present biomedical engineering research. While many biomedical engineering graduate programs provide instruction on the interface between engineering and health as well as the technical skills required to conduct biomedical research (experimental procedures, mathematical modeling, etc.), there is little, if any, formal instruction on how to propose and plan scientific research. Typically through most graduate programs, it is generally expected that students will learn these skills during the course of their research. Thus, there is no guarantee that students will ever adequately develop this skill set and consequently the quality of the research may suffer. Similarly, ethical considerations also tend to be overlooked or are dealt with at a broad, general level and students are not provided with field-specific or context-specific issues. The proposed Foundation courses will provide learning in these particular areas as well as anatomy & physiology instruction geared for engineering students. The remainder of the required coursework is a series of elective courses within the three focus areas of the program.

Program Structure and Content

The degree requirements will be similar to other graduate engineering programs at Ryerson, and will be comprised of both coursework and research (or project) components. The coursework component is a combination of both Foundation (mandatory) and Elective courses (Tables 5 and 6, respectively) to provide the fundamentals in biomedical engineering as well as research-specific instruction. As such, the supervisor can shape the course selection so that the student gets depth in certain areas of biomedical engineering in addition to breadth of expertise, which is required at the advanced degree level. Formal degree requirements for PhD, MASc and MEng programs are summarized in Table 4.

MEng in Biomedical Engineering
The MEng program aims at developing interdisciplinary skills and gaining a deep understanding of technological and scientific knowledge in biomedical engineering, in order to produce highly trained and qualified BME graduates who plan careers in research and development in bioengineering. The course-based MEng program promotes the acquisition of a specialized education for professional practice purposes.

The MEng program comprises 8 courses, and the student is required to conduct an applied advanced project involving one (or more) of the following above fields. The project is carried out under the guidance of the supervisor and monitored by a guiding committee. The student must submit the completed project in the form of a technical report to an examination committee and make an oral presentation of the report to this committee, which will assess and grade the report.

MASc in Biomedical Engineering
The MASc program aims at developing interdisciplinary skills and gaining a deep understanding of technological and scientific knowledge in biomedical engineering, in order to produce highly trained and qualified BME graduates who plan careers in research and development in bioengineering. The thesis-based MASc program promotes the development of the scientific aspects of the education and training and includes directed research.

The MASc program offers 5 courses, and the student is required to conduct advanced research on a topic related to one (or more) of the fields mentioned above. The topic is chosen in consultation with the student's thesis supervisor. The student must submit the completed research in a thesis format to an examination committee and make an oral presentation of the thesis to this committee, which will assess the thesis (pass/fail). Through the thesis, the student is expected to furnish evidence of competence in research and a sound understanding of the specialty area associated with the research.

PhD in Biomedical Engineering
The purpose of the PhD program in biomedical engineering is to provide students with an advanced knowledge and interdisciplinary set of skills to understand and address real-life biological/science problems from biomedical engineering perspectives. The program will have a direct impact on health care and society through the education and training of next-generation leaders, who will shape the cutting-edge of research, create and translate new knowledge in a variety of biomedical applications.

In the PhD program, the student is required to take 4 courses and is required to conduct advanced and original research on a topic related to biomedical engineering. The student will prepare and present a detailed research proposal prior to starting their respective research. The research will be carried out under the direction of the supervisor(s). The student must submit the completed research in a thesis format to an examination committee and make an oral presentation of the thesis, which will assess the thesis (pass/fail). The thesis must present original research that makes a significant

original contribution to knowledge in the field of biomedical engineering. Through the dissertation, the student is expected to furnish evidence of competence in research and a deep understanding of the specialty area associated with the research.

Special Accommodation

Ryerson University has extensive collaborations with the surrounding hospitals including St. Michael's Hospital (SMH), University Health Network (UHN), Sunnybrook Hospital, Mount Sinai Hospital and the Hospital for Sick Children. With the recent agreement for creation of iBEST between SMH and Ryerson to host Ryerson top-tier researchers in biomedical engineering and SMH physician-scientist at the Li Ka Shing Knowledge Institute (approximately 22,000 sq. foot), the students will benefit from a unique opportunity for internship and training at this state of the art education and research facility. Also, the recently signed Memorandum of Understanding (MoU) between Ryerson University and UHN should provide students with a collaborative environment.

Table 4: Formal Degree Requirements

MEng	MASc	PhD
8 course credits[1] and research project (credits may include: 1 directed studies course[2,3]; 4 from a related program area. 10 course credits[1] (credits may include: 1 directed studies course[2,3]; 4 from a related program area.	5 course credits[1] (credits may include: 1 directed studies course[2,3]; 2 from a related program area.	4 course credits[1] (credits may include: 1 directed studies course[2,3]; 2 from a related program area.
Internship/Project[4]	Thesis	Candidacy Examination and Thesis Proposal; Dissertation
Minimum time for completion: 1 year	Minimum time for completion: 1 year	Minimum time for completion: 2 years
Maximum time for completion: 3 years	Maximum time for completion: 3 years	Maximum time for completion: 6 years

[1] All courses are one semester and are equal to one (1) course credit, unless otherwise stated.

[2] A student enrolled in the MEng, MASc or PhD program is permitted to take only one (1) Directed Studies course, including substitutions (e.g. related programs).

[3] A student is permitted to take not more than two (2) courses taught by his/her supervisor, one of which may be the "BE8003: Directed Studies in Biomedical Engineering" course.

[4] MEng students may apply to substitute two (2) courses for the research project.

1.4. Mode of delivery

The mode of delivery of the proposed graduate program will be similar to other graduate engineering programs at Ryerson. It is expected that the coursework

requirement will fulfilled as soon as possible (depending on course availability) to maximize the time allotted for their research thesis (MASc), project (MEng), or dissertation (PhD) which will be conducted in the laboratory facilities of their supervisor.

1.5. Assessment of teaching and learning

MEng in Biomedical Engineering
For the graduate courses, evaluations will be based on midterms, final exams, assignments and group projects. For the research-project, students will submit a technical report that will be assessed by supervisor and an additional reader.

MASc in Biomedical Engineering
For the graduate courses, evaluations will be based on midterms, final exams, assignments and group projects. For the research-based component, students will submit regular progress reports (according to YSGS policy) and final thesis oral exam. For each progress report, the supervisor will provide a written assessment of the student's progress along with recommended considerations or changes, as appropriate.

PhD in Biomedical Engineering
Assessment of student achievement will be initially similar to the MASc program with additional requirements after the first year. After completion of the PhD candidacy exam, students will continue to meet with their supervisory committee at least once every 12 months until a recommendation for the Departmental Oral Examination is made and, subsequently, the final PhD Oral examination. For each progress report, the supervisor will provide a written assessment of the student's progress along with recommended considerations or changes, as appropriate.

1.6. Resources for the proposed program

Infrastructure, Space and Laboratory Access
Given the existing research laboratory facilities in FEAS and iBEST, minimal additional resources are required for the program in terms of infrastructure.

Faculty and Administrative Resources
The program will require the following staffing resources:

i. **Graduate Program Director (GPD):**
The GPD will be responsible for administering the program, developing program policies, chairing the program subcommittees (Admissions and Scholarship. Curriculum, Membership committees), and developing examination requirements as needed. The GPD will receive an annual stipend and single course release. The GPD has already been appointed (currently Dr. Stephen Waldman, until 2017).

ii. **Graduate Program Administrator:**

The graduate administrator will help the GPD in day-to-day operations. The assistant will be a shared appointment (commensurate with other FEAS graduate programs) between with the other new graduate programs under development.

iii. New Faculty Hires:

The proposed curriculum as is could be offered through existing faculty members in FEAS. Any new faculty hiring positions will be contingent on student enrollment growth. .

Supervision

The following is a list of current Ryerson University faculty members who are program members and have expressed interest in acting as dissertation/thesis/project supervisors for the program:

Primary Appointments to FEAS Departments

Dr. Yasar Dahman CHE	Dr. Karthi Umapathy ECE
Dr. Dae Kun Hwang CHE	Dr. Victor Yang ECE
Dr. Stephen Waldman CHE	Dr. Habiba Bougherara MIE
Dr. Javad Alirezaie ECE	Dr. Farrokh Sharifi MIE
Dr. Mike Kassam ECE	Dr. Mark Towler MIE
Dr. Sri Krishnan ECE	Dr. Scott Tsai MIE
Dr. Kristina McConville ECE	Dr. Krishnan Venkatakrishnan MIE
Dr. James Smith ECE	Dr. Marcello Papini, MIE

Cross-Appointed to FEAS Departments

Dr. Gregory Hare, SMH (cross appointed to ECE)
Dr. Wolfgang Kuebler, SMH (cross appointed to ECE)
Dr. Ori Rotstein, SMH (cross appointed to ECE)
Dr. Andrew Baker, SMH (cross appointed to ECE)
Dr. Yeni Yucel, SMH (cross appointed to MIE)

Financials

At steady state, we expect student enrollment of 14 MEng students (domestic) and 15 MASc students (domestic) in the program at any given time[2]. For the PhD program, an intake of 3 students per year is expected. Note that MEng, MASc, and PhD enrollment will be managed within the current quota of Master's and PhD funded spaces assigned for FEAS programs. Similarly, the costs associated with resources for these programs will also be absorbed by FEAS. As a worst-case scenario with this level of enrollment, the program is essentially cost neutral, based on the following financial forecast:

- Annual revenue from student tuition[3] and provincial grant income[4]: $615,000

[2] These figures are based on an annual intake of 8 MASc students and 8 MEng students as well as historical times to completion with FEAS graduate engineering programs.

[3] $9,189/student/year; based on 2014-2015 figures.

[4] $13,616/student/year; based on 2014-2015 figures.

- Annual direct costs required to run the program: $371,000
    - Teaching salaries[5] and sabbatical leave[6]: $235,000
    - GPD stipend and course release[7]: $15,000
    - Administrative support[11] (0.5 FTE): $36,000
    - Program promotion: $17,000
    - Graduate student support[8]: $63,000
    - Library costs[9]: $5,000
- Annual indirect costs (40%): $246,000

Ryerson Library Resources Collections

The Ryerson Library hosts over 600,000 monographs in electronic, print, audio and video form, subscribes to well over 56,000 online journal subscriptions and provides access to over 200 online databases that contain full text articles, abstracts, images, historical documents, global news sources and datasets. All told, the acquisitions budget totals over $4.4 million dollars.

The collection development philosophy is very much holistic in its intent. In response to the rise of interdisciplinary studies in the academy, the Library has ensured that librarians engage in collection development not motivated by strict subject silos, rather by the needs of all program areas. Collection decisions are made to improve resources for all users. Making new acquisitions available is the priority, and there is less concern about which subject area should pay for it. This has made the Library nimble in identifying areas in need of strengthening and lessening the bureaucracy involved in making collection decisions. All efforts are made to fulfill requests of faculty and students, within reason.

Similarly, a committee comprised of librarians representing all subject areas gets requests for new serials and electronic resources. The committee considers all requests and approvals are granted based on a myriad of factors, including usability, cost, access, and relevance to programs of study at Ryerson.

Where at all possible, the Library works with national and provincial consortiums, the Canadian Research Knowledge Network (CRKN) and the Ontario Council of University Libraries (OCUL) to negotiate licenses for electronic resources. This increases purchasing power, and allows for assurance that the content purchased is archived in perpetuity on servers housed at University of Toronto via the Scholars portal initiative.

Interlibrary Loans

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[5] *Inclusive of benefits (21%), where applicable.*

[6] *Based on 10 courses at $17,000/course and sabbatical leaves calculated at 1/7th of teaching salaries.*

[7] *GPD stipend $5,000; Single course release: $10,000.*

[8] *$4,200/student/year; MASc program students only.*

[9] *Library seminars and tutorials (literature searches, citation management, etc.).*

The Interlibrary Loan (ILL) service allows users to borrow items and obtain articles from other libraries through our ILL staff, if the Ryerson University Library does not own materials. This service is provided free of charge.

1.7. Quality and other indicators

There are three key components required to run a successful Graduate Program in Biomedical Engineering:

1. **Quality Students**
   Availability and quality of scholarship and mentorship to attract the best students.
2. **Quality Delivery**
   Program delivered by seasoned faculty members with demonstrated teaching abilities, supervisory experience, and research track record.
3. **Quality Infrastructure and Resources**
   Availability of space conducive to conduct research and engage in collaboration.

The proposed program will be led by the GPD and housed within the Dean's Office of FEAS. Highly qualified faculty with demonstrated excellence in teaching, research, and mentorship will deliver the program content in terms of instructional courses and research supervision. Once the program is implemented, Ontario University Council on Quality Assurance processes and indicators[10] will be used to ensure program quality. Within this context, the following indicators of student performance are of importance to ensure program quality:

Time-to-Completion
The Graduate Program in Biomedical Engineering is comprised of both coursework and research (or project) components. As the majority of the coursework requirements will be completed within the first year of the program, the research-based component will be the major controlling factor for students to complete their degree program. While much effort will be placed on preparing students to complete the research-based component in a timely fashion (facilitated through the Foundation courses and providing adequate supervision and mentorship), there can be several external factors beyond the student's control which could delay graduation. The minimum time to completion is 1 year for MEng and MASc students, and 2 years for PhD students, whereas the maximum time to completion is 3 years for MEng and MASc students, and 6 years for PhD students (Table 4).

Graduation rates will be one of the key program quality indicators with the following targets, based on degree program:

- MEng students: > 75% graduated by 2 years, > 90% graduated by 2.5 years.
- MASc students: > 75% graduated by 2 years, > 90% graduated by 2.5 years.

[10] *OUCQA quality indicators can be found at : oucqa.ca/framework/4-3-evaluatioon-criteria-3/*

- PhD students: > 75% graduated by 4 years, > 90% graduated by 5 years.

Rates of Completion
Another program quality indicator is withdrawal from the program and our target is keep student attrition rate to < 10%, and > 90% of enrolled students will continue to graduation, irrespective of degree program.

Research and Scholarly Output by Students
A key indicator of program quality is the research and scholarly output by students. While research and scholarly output can be difficult to quantify, there is an expectation that the research-based component of the student's program will result in tangible and quantifiable outputs. Notwithstanding industrial-sponsored research projects (which may not lend themselves to, or impose delays on, scholarly works/publication), our ***minimum*** target is to have the following research output by students enrolled in the program to be completed by, or shortly after graduation:

- MASc students: one (1) peer-reviewed publication/book chapter/technical report
- PhD students: three (3) peer-reviewed publications/book chapters/technical reports

Student Satisfaction Surveys
The proposed program is dedicated to offering the highest quality graduate-level education and is designed to meet the needs of the students. Central to this commitments is the goal of continuous improvement. Student's course evaluation will be conducted and retrospective sessions will take place with the course instructors and research supervisors to determine areas of improvement. Three critical areas of focus will be students rating of: (i) course value, (ii) course instructor effectiveness, and (iii) effectiveness of research supervision and mentorship. Our target will be > 90% student satisfaction with each criteria.

Post-Graduate Status
Biomedical engineering surveys indicate that almost a third of graduates go straight into the workforce, a third continue in graduate studies, and one third on to medical school. Our expectation is that the > 90% of graduates will be employed full-time in biomedical-related industry (including post-doctoral fellowships) within six months of graduation, or will pursue higher post-graduate education (continue to MASc/PhD/MD programs).

APPENDICES

A. **Institutional Response to the External Reviewer(s)' Report**

Yeates School of Graduate Studies

Response from YSGS on the
Site Team Report for the proposed graduate programs
in Biomedical Engineering
Dr. Jennifer Mactavish, Dean YSGS
Dr. Anthony Bonato, Associate Dean YSGS

The site team for the new graduate program proposal in Biomedical Engineering consisted of Dr. Adrian Chan (Carleton University) and Dr. Michael Kallos (University of Calgary). The site visit was conducted on July 16, 2015. The site team report was communicated to the Associate Dean, YSGS on July 26, 2015, and the response to the report from the Biomedical program team was communicated on August 16, 2015.

The site team expressed a strong endorsement of the proposed Masters and doctoral BME programs, and deemed them to be viable, of high-quality, and found them well-aligned with the strategic growth directions of Ryerson University. Several recommendations were made to improve the proposal, and these are outlined below.

As mandated by Ryerson Senate Policy 112, what follows is the YSGS-level response to the site team report, and the response to the report of the Biomedical program team. We summarize below the recommendations and responses. We divide recommendations into two broad categories: academic and administrative. The role of YSGS is to provide direct commentary on academic matters, while making suggestions for administrative matters. For simplicity, we supply our responses (as well as a recap of the site team recommendations and BME responses) in the form of tables.

We begin with an overview of the main academic recommendations. Note: the recommendations are numbered in the order that they appeared in the site team report.

MAIN ACADEMIC RECOMMENDATIONS

Recommendation	**Biomedical response**	**YSGS response**
Recommendation 1: **Interdisciplinary Aspects of the Program.** Researchers have a number of strong collaborations, including clinical collaborators at St. Michael's and many of the other Toronto	We agree with the reviewers that the interdisciplinary nature of the program was not efficiently articulated in the draft proposal. There are currently 11 St. Michael's Hospital faculty who have cross-appointments at Ryerson, 5 within the Faculty of Engineering and Architectural Science (FEAS), who can act as graduate student supervisors. These faculty have been	YSGS supports the program level response, and we encourage the emphasis of interdisciplinary in the brief from both within and outside FEAS.

hospitals. These collaborations were mainly noted during the site visit. The strength and interdisciplinary nature of the collaborations are not as apparent within the brief. Documenting current and future links outside of the departments offering the program would be advantageous to future student recruitment and growth of the program and would strengthen the brief	included as program members and potential supervisors in Section 2.3: *Program Governance Structure* and Section 3.6: *Resources (Supervision)*.	
Recommendation 2: **Expanding Course Offerings and Piggyback Courses** The number of elective courses listed in Table 6 seems limited. A number of these courses are piggybacked on 4th year biomedical engineering courses associated with the undergraduate program. There is a reliance on OVGS opportunities (e.g., University of Toronto courses) to provide students a variety of courses. While the current list of elective courses may be adequate initially, Ryerson should plan for an expansion of elective offerings. This point was emphasized by the students interviewed as part of the site visit.	As the reviewers have indicated, the current list of elective courses is adequate for the initial launch of the program. We also agree that as the program operates, there will be a need to include additional course offerings based on student enrollment. The program Curriculum Committee will be responsible for determining the need of new courses to ensure effective operation of the program. This information has been included in Section 2.3: *Program Governance Structure (Curriculum Committee)* and Section 3.3: *Program Structure and Content (Course Listings)*.	YSGS supports the program level response, and looks forward to working with the program towards enhancing its curriculum offerings.
Recommendation 3: **Letters of Support** Some program courses are offered by departments outside the participating engineering	There are currently only four (4) courses listed within the program that are offered by departments outside of the participating FEAS departments. All of these are offered through the Department of Physics (Faculty of Science) and a	YSGS supports the program's response.

departments, including the compulsory course BP 8114 Anatomy and Physiology offered by Physics. There should be letters of support from all units offering program courses that explicitly state that they will accept biomedical engineering students into their courses; if there are restrictions that are imposed on these courses (e.g., caps), they should be noted.	letter of support for including these courses within the program's offerings was received on July 29, 2015 from Dr. Carl Kumarades (Graduate Program Director, Department of Physics) and Dr. Ana Milic (Chair, Department of Physics). This information has been included in Section 3.3: *Program Structure and Content (Course Listings)* and Appendix D.	

OTHER RECOMMENDATIONS:
ACADEMIC

Recommendation	**Biomedical response**	**YSGS response**
Recommendation 1: **Course Requirements** The PhD course load appears to be a bit high; many PhD programs in Canada have a 3 course requirement or less. Ryerson may wish to retain this 4 course requirement; however, for students who have already taken the 2 compulsory courses (e.g., those who have complete their master's degree in biomedical engineering), it may be sensible to waive these requirements, reducing the course requirements to 2 courses. Similarly, from a learning outcomes perspective, it may make sense to provide a level of advanced standing (1 to 2 courses) for students with an undergraduate degree in biomedical engineering when they enter their master's	We agree that the course load may be restrictive, especially for those students entering the program with a prior graduate degree in biomedical engineering. According to the reviewer's suggestion, we have included an "Advanced Standing" designation for prospective PhD students with a corresponding reduction in the number of required courses. This information has been included in Section 3.2: *Admission Requirements (Advanced Standing)*. An "Advanced Standing" designation for prospective Master's students (MEng or MASc) with a prior undergraduate degree in biomedical engineering was not adopted as the breadth of courses at the Master's level is important to the essence of the program.	We agree with the site team's recommendations regarding the a potential reduction of the number of courses for PhD students. The Biomedical team's response is appropriate.

degree.		
<u>*Recommendation 2*</u>: **Differentiation from IBBME** The brief attempts to differentiate the proposed biomedical engineering program from the University of Toronto IBBME. The brief indicates that the Ryerson program focuses mainly on the electro-mechanical aspects, which is no longer a major focus within the IBBME; this addresses the proposed fields of biomedical signal analysis and biomechanics. The proposed field of biomaterials was not differentiated explicitly in the brief; however, during the site visit, it was apparent that program was clear on how it would be differentiated from the IBBME (e.g., IBBME is focused more on regenerative medicine); this explanation was satisfactory to the external reviewers. This part of the brief should be strengthened, especially given the proximity of the IBBME and its long history.	A greater explanation of the differentiation from the research focus of the IBBME has been included in Appendix C: *Comparative Analysis of Program (Biomedical Engineering Graduate Programs within the GTA).*	Differentiation of the Biomedical graduate programs is of importance in the approval process, especially as the program seeks Quality Council and MTCU approvals. The details added by the Biomedical team to the brief address these concerns.
<u>*Recommendation 3*</u>: **Learning Objectives** The program goals and learning objectives are appropriate for a graduate program in biomedical engineering and addresses the Degree Level Expectations, except for a noted absence of an	The absence of an explicit statement with regards to biomedical ethics in the Degree Level Expectations was an oversight which has now been corrected (Section 2.4: *Program Level Learning Outcomes*). We agree that different departments and supervisors may have different expectations with regards to Research and Scholarship. For this reason, we	YSGS supports the program's response.

explicit statement with regards to biomedical ethics. While the program curriculum does include this learning, it is not indicated as a primary learning outcome. Some of the Research and Scholarship Expectations, and corresponding learning outcomes, are supported by the program through the student's own research under their supervisor. There is a danger when having programs offered through the combined effort of multiple departments, as different departments and supervisors may have different methods and expectations with regards to topics such as Research and Scholarship. There is an opportunity for the program to provide some guidance, particularly as the program grows, for a common ground with respect to these types of outcomes.	have articulated the minimum expectation of research and scholarly output for each of the degree programs offered as outlined in Section 3.7: *Quality and Other Indicators (Research and Scholarly Output by Students)*.	
Recommendation 4: **Professional Development** The external reviewers encourage Ryerson to ensure rich opportunities for professional development, which may be intended but are not clear in the brief. Students expressed a strong desire for professional development opportunities, including	Professional development activities have been included in the delivery of BE8002: Seminars in Biomedical Engineering along with other research and learning opportunities to enrich the quality of education in the program. This information has been included in Appendix A: *Course Descriptions*.	We suggest adding to the proposal reference to the availability of *Future Smart*, the suite of professional development offerings of YSGS. Future Smart is free for all Ryerson graduate students, and students who complete it receive a record of their completion on their transcript.

communications, grant writing, and project management.		
Recommendation 8: **Proposed Research Fields** The brief notes other areas that do not seem to fit well within these fields, such as biomedical sensors, instrumentation, and medical imaging. It is unclear how students researching in these areas might fit within the three identified fields.	We have revised for the three (3) proposed research areas to incorporate all of the identified research fields within the program. This information is located in Section 2.2: *Summary of Graduate Program in Biomedical Engineering*.	YSGS supports the program's response.
Recommendation 11: **Supervisory Committees** Consideration should be given the makeup of the supervisory committee. It is anticipated that in many biomedical engineering research projects, there would be a benefit in having a clinical researcher as part of the supervisory committee; potentially a co-supervisor. This would help ensure integrated knowledge translation through the research. However it was noted that not all biomedical engineering research has a clinical application, and the clinical researcher could be replaced with an alternative researcher who may be able to apply the research (basic scientist, nursing, etc.). It is also important to ensure that the supervisory committee supports the students throughout the graduate	While we agree that the majority of biomedical engineering research projects would benefit from having a clinical researcher (or alternate research who could apply the outcomes of the research) as a co-supervisor and/or member of the supervisory committee, we are reluctant to make this a requirement. For the same reason that not all biomedical research has direct clinical applications, it may neither have direct applications to other fields. Policies regarding supervisory committee membership are outlined in the Ryerson University Senate's *Graduate Admissions and Studies Policy* (Policy #142). The program Curriculum Committee will ensure that the appropriate policies are followed, as graduate supervisory committees fall under their mandate as outlined in Section 2.3: *Program Governance Structure (Curriculum Committee)*. The roles and responsibilities of graduate student supervisory committees (including the frequency of interaction, progress reports, etc.) are outlined in the Ryerson University Senate's *Graduate Admissions and Studies Policy* (Policy #142) and Yeates School of Graduate Studies Policy: *Graduate Supervision Guidelines*. The program Curriculum	As the program notes in its response, the site team's recommendation is too prescriptive in this point. The makeup of supervisory committees should be reflective of the students thesis direction. Nevertheless, Policy 142 outlines the policies for supervisory committees, as the program response points out.

program and not simply be present at the defense; this is of particular importance for students in the PhD program. One way to do this would be to have regular meetings with a copy of the minutes sent to the program office for the student file.	Committee will ensure that the appropriate policies are followed, as graduate supervisory committees fall under their mandate as outlined in Section 2.3: *Program Governance Structure (Curriculum Committee)*.	

OTHER RECOMMENDATIONS:
ADMINISTRATIVE

Recommendation	**Biomedical response**	**YSGS response**
Recommendation 5: **Staff support** There is only a 0.5 full-time equivalent support staff associated with the biomedical engineering program. Given the complexities of an interdisciplinary program, this staffing level may prove to be inadequate.	Currently, only a 0.5 FTE support staff is associated with each graduate program offered through FEAS, which has proven adequate. As such, we do not anticipate that this level of staffing will be a hindrance to program operation.	The program response is adequate. Other graduate programs with a similarly size cohort have the same staff support.
Recommendation 6: **Library Resources** With respect to library resources, the brief provides general information regarding the library but nothing specific with regards to the program, except for an estimated $5,000 annual budget. The brief would benefit from some details from a subject specialist from the library.	Greater explanation of the budget associated with library costs has been provided in Section 3.6: *Resources (Financials)*.	YSGS supports the program's response.
Recommendation 7: **Student Stipends** The level of funding for graduate students was not noted in the brief. During the site visit, graduate student funding was indicated to be around $16k-$22k/year for current graduate students engaged in biomedical engineering research, which seems reasonable. The brief could be improved by indicating typical funding levels for	We agree that graduate student funding norms may differ across the membership departments and may potentially create inequities between the students enrolled in the program. For this reason, recommendations regarding policies/practices for graduate student funding is a mandate of the program's Admissions and Scholarship Committee. This would	YSGS supports the program's response.

graduate students and specify a minimum funding level, if there is one, that will be put in place. It would be helpful to indicate whether or not the funding levels are comparable to other engineering programs, and whether TA-ships and scholarships are part of this total.	include all sources of funding including research assistantships, teaching assistantships and other internal funding sources of funding. This information is located in Section 2.3: *Program Governance Structure (Admissions and Scholarship Committee)*.	
Recommendation 9: **Admissions** The admissions criteria appear to be appropriate. As an interdisciplinary degree program it is noted that not all students will come with an engineering background. While the admissions criteria notes that students should have an undergraduate degree in engineering or a related field in biomedical sciences, it was felt that text could be further clarified on what is meant by "related field in biomedical sciences" (e.g., providing examples).	Examples of acceptable "related fields in biomedical sciences" has been provided in Section 3.2: *Admission Requirements*.	YSGS supports the program level response.
Recommendation 10: **Budget** The financial planning of the biomedical engineering graduate program should be revisited. The brief suggests that the program will be neutral or run at a loss, which does not seem realistic. Perhaps that this project is a worst-case scenario; if so, it should be communicated as such.	The financial estimates were provided as a worst-case scenario. This information has been included in Section 3.6: *Resources (Financials)*.	The University Planning Office conducts an initial costing on the program, and the financial viability of the program is determined by the Ryerson Board of Governors and its subcommittees.

In conclusion, we thank the external reviewers and colleagues in Biomedical engineering for a very thorough assessment of the strengths and challenges of the proposed Biomedical engineering graduate programs. The site visit team's recommendations and the Biomedical team's responses raise important points regarding the program, and the discussion of these will only have a positive development in the evolution of the program.

Doctorate in Mathematical Modelling and Methods

Faculty of Science
Ryerson University

Program Proposal

Proposal amended and prepared in conjunction with the Quality Assurance Framework for submission to Ontario Universities Council on Quality Assurance and Ryerson Senate

September 22, 2015

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1. Introduction

1.0. Executive Summary

The Department of Mathematics is requesting approval to begin enrollment for a doctoral program in *Mathematical Modelling and Methods* starting September 2016. The following letter of intent adheres to the Senate Policy 112 and includes the rationale for this graduate program, a description of the program curriculum, and a list of the supportive infrastructure being contributed for this program.

Mathematical Modelling and Methods in Toronto, and Ryerson University has the capacity and expertise to provide an innovative program of graduate study in this area. Ryerson's proximity to leading-edge resources (e.g., research institutes, centres for biomedical research, university hospitals, and financial institutions) is available to prospective doctoral students for the advancement of their professional knowledge. The Department of Mathematics is already collaborating with a number of industry partners and is currently establishing new relationships, including with the government of Canada. This will enable the program to provide potential Ph.D. students a unique "hands-on," experiential opportunity for gaining employment with industry and various research facilities.

There is also a strong need for additional graduate opportunities for Canadian youth. The program complements YSGS's commitment to excellence in graduate education, and will contribute highly trained graduates to meet the employment demands of the Greater Toronto Area. The program presents a natural extension of the existing Master's program in *Applied Mathematics*, with three new courses designed to develop the expertise of the students in their chosen field of study. Graduates of the program will be able to conduct scientific research of high standard and, upon the completion of doctoral studies, will acquire skills that will make them perfectly suited for work in an academic environment as well as in industry research.

The program consists of three main fields of study: 1) *Discrete Mathematics and Networks*; 2) *Financial Mathematics*; and 3) *Biomathematics and Fluids*. The anticipated program intake consists of two (2) full-time students per year, with a steady state of eight (8) students. The requirements of the program consist of three (3) one-term elective courses, regular attendance of the doctoral student seminar, the candidacy exam with written and oral components, and the thesis work, culminating in the oral defense of the doctoral thesis.

Given the steady and significant increase in the levels of external research funding and collaboration with industry partners among faculty in the past six years, the Department is well positioned to support a doctoral program in *Mathematical Modelling and Methods*, in addition to the existing Master's program in *Applied Mathematics*. A total of 20 core faculty members from the Department of Mathematics will serve as the core faculty for the proposed Ph.D. program. The faculty members who are members of the YSGS have considerable experience supervising and co- supervising a large number of graduate students, both at Ryerson and other universities in Canada and abroad.

1.1. Objectives of the program

The objectives of the proposed doctoral program are:

1. To provide an advanced, interdisciplinary research-focused program for graduate students in the fields of *Biomathematics and Fluids, Discrete Mathematics and Networks*, and *Financial Mathematics*.
2. To train highly qualified personnel to fill the need for advanced, interdisciplinary expertise with experience and skills in the three proposed key areas.
3. To offer students the opportunity to further their professional development in research, critical thinking, and scientific communication.
4. To conduct advanced leading-edge research in the three proposed key areas.
5. To foster interactions with other partners in universities, industries, and government institutes within the country and internationally through research collaborations, student co-supervisions, and faculty/student exchanges.

These objectives are consistent with Ryerson's mandate for developing relevant programs and its goal of delivering the highest-quality applied education in Canada

Learning Outcomes and Doctoral Degree Expectations
Intended Learning Outcomes for the PhD in Mathematical Modeling and Methods consist of the following:

Graduates of this program will be able to

1. Communicate with specialists from a variety of interdisciplinary fields in order to isolate the underlying structures and identify strategies and obstacles that can be used to analyze and interpret problems using mathematical tools.
2. Formulate strategies for addressing complex mathematical and computational problems from a variety of fields.
3. Construct and design mathematical models (e.g. protein networks, social networks, modeling financial portfolios, risk analysis).
4. Apply a variety of tools and techniques from applied mathematics including biomathematics and fluids, discrete mathematics, and financial mathematics.
5. Demonstrate leadership skills in the application and translation of mathematical tools to industries such as health care, finance, and technology.
6. Contribute to furthering the field of applied mathematics and demonstrate the ability to identify new areas of the field in which to develop one's own proficiency.
7. Conduct research in accordance with professional and academic integrity.
8. Communicate ideas and results in writing, verbally and by graphic means in a clear mathematically sophisticated manner for various audiences.

These outcomes will be henceforth referred to as LO1 to LO8.

Table 1: Doctoral Degree Expectations

DOCTORAL DEGREE EXPECTATIONS	*This degree extends the skills associated with the Master's degree and is awarded to students who have demonstrated:*
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.
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.
3. Level of Application of Knowledge	a. The capacity to 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.
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 behaviour 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.
5. Level of Communication Skills	The ability to communicate complex and/or ambiguous ideas, issues and conclusions clearly and effectively.
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.

1.2. Admission requirements

(a) Existing admission to the Master's program requires a four year's Bachelor of Science degree in mathematics or related fields involving adequate mathematical course work, accompanied by two letters of recommendation from former instructors (post-secondary level). To be eligible for admission, a minimum B average is required in the applicant's last two years of undergraduate study. Applicants with an undergraduate degree in a language other than English are required to have achieved a minimum TOEFL score 580 and a test of written English (TWE) score of 5, or the equivalent in other related tests (MELAB, IELTS).

Other four year degree holders with good academic standing have been considered for admission on an individual basis.

(b) A Master of Science degree in Applied Mathematics or a discipline related to Applied Mathematics will be required for entry in the proposed PhD program. Applicants from other academic programs will be considered on an individual basis. Applicants must have a cumulative GPA of at least B+ in courses credited to their Master's degree. They will also be required to submit three letters of recommendation from academic referees who can judge the candidate's potential to engage in research at the doctoral level. Furthermore, the applicant must demonstrate evidence of research potential in the form of a Master's thesis,

or a publication that has appeared in a refereed journal or conference proceeding. Alternatively, a student who has satisfactorily completed 12 months of the Applied Mathematics MSc program may apply to transfer into the PhD program. Transfer into the PhD program is based on both satisfactory progress in the MSc program and a Transfer Examination as detailed in section 4.3.2. In order to apply for transfer into the PhD program, the candidate must meet the following minimum criteria:

- They will normally have an B+ or better overall average on at least two elective graduate courses, plus satisfactory performance in the seminar course including their first presentation.
- They must have completed a minimum of one research progress meeting with their Supervisory Committee. The student's status, as assessed at the last meeting before applying for the Transfer Exam must be "satisfactory". In addition, the committee must certify that the student is exhibiting exceptional promise in their research.
- They must have normally completed at least 12, but normally no more than 18, months of their M.Sc. program, from date of first registration.

1.3. Structure

The program will be administered by the Faculty of Science under the auspices of the Yeates School of Graduate Studies, featuring faculty members from the Department of Mathematics and utilizing the Department's facilities and infrastructure.

The curriculum is structured to facilitate completion in four calendar years of full-time study[1] with a major emphasis on the thesis research during all years. A Master of Science degree in Applied Mathematics or a discipline related to Applied Mathematics will be required for entry in the PhD program. Within 20 months of entry into the program, students will be required to pass a candidacy exam. The aim of the candidacy exam is to evaluate the student's ability to discuss and defend the research proposal, the feasibility of the proposed thesis project and to evaluate the student's knowledge in the area of the proposed research and related areas.

Based on the faculty complement (see section 1.8.1), the proposed structure will cover the intake of two (2) PhD students planned for the first year and, as the doctoral program grows to reach the proposed steady state of eight (8), one additional faculty member is expected to be hired in the program's second year of operation. Anticipated teaching loads of research-focused faculty will be three (3) one-term courses per academic year.

[1] *Since there is no part-time option in this program, table related to "time path of part-time students through the program" is not provided.*

1.4. Program content

Innovative Features

The innovative features of the proposed PhD program in *Mathematical Modelling and Methods* at Ryerson are as follows:

1. Focus on three areas that provide an in-depth theoretical background for research in:
    a. Computer Science and Information Technology
    b. Finance and Economics
    c. Medicine and Biotechnology

    These areas have been identified as fundamental areas of development nationally and globally and are areas of research strength in the Department of Mathematics.
2. Develop courses focusing on interdisciplinary, cutting-edge topics in mathematics and industrial applications of mathematical modelling.
3. Offer "hands-on" experience through collaboration with industry partners, governmental agencies, the Digital Media Zone, and other incubators at Ryerson University.
4. Provide access to a core group of faculty with national and international reputations in a diverse set of cross-disciplinary research areas.

Presently, the only other graduate programs, which offer graduate training comprising the area of Mathematical Modelling are the following:

- Trent University offers an MSc/MA in Applied Modelling and Quantitative Methods.
- UOIT offers MSc and PhD in Mathematical Modelling and Computational Science.

One can also do a PhD in:

- Applied Mathematics at University of Western Ontario or University of Waterloo, which might be similar to the Biomathematics and Fluids stream.
- Financial Mathematics at University of Toronto, York University, McMaster University, or University of Western Ontario; regardless whether they are housed in Mathematics, Computer Science, or Statistics departments, these programs might include some modelling components.
- Combinatorics and Optimization at University of Waterloo and Theoretical Computer Science at University of Toronto. The Discrete Mathematics and Networks streams seem to be more unique but these two programs might be crafted to train PhD students with similar skillsets.

These programs are more general and oriented on pure research and creating publishable mathematics. The proposed program is smaller, tight-knit, and oriented on applications and collaboration with industry partners. On the other hand, links between the three areas of expertise are, according to our knowledge, uniqe and not offered anywere in Ontario.

Student Research

A minimum of three one-term course credits beyond the Masters degree will be required for the PhD degree, in addition to successful performance in the PhD candidacy examination and completion of the doctoral thesis and its defence. At the recommendation of the candidate's thesis supervisor and with the approval of the Program Director, one or more additional courses may be required for students with a broader disciplinary background who need additional graduate preparation leading to the candidacy examination. The thesis supervisor, and the candidate's supervisory committee, must approve the course selections or exemptions for each PhD candidate.

Students will be required to undertake a significant piece of original research and to write up and defend their research through a final defence examination. Students will also be required to take at most 3 one-term courses selected from the elective course list which includes the current list of Applied Mathematics MSc program course electives plus at least one new 9000-level course. Students who have successfully transferred from the Applied Mathematics MSc program into the PhD program will have their course credits counted toward their PhD degree. In addition, students will be required during all years of study to participate in the seminar course which is a part of the current MSc program (pass/fail). Equivalency credits for courses taken in other graduate programs may be given at the discretion of the program director.

The doctoral program will build on the structure already in place for the MSc program including:

1. Students will be matched with a supervisor at the time of admission based on student's expressed preference for both the area of research and supervisor as well as the supervisor's agreement to supervise the candidate. Typically, PhD applicants would contact potential supervisors before or at the time of admission.

2. Each student will have a Supervisory Committee selected in conjunction with the supervisor and approved by the program director. The committee will include the supervisor and two other members, both of whom must be members or adjunct members of the School of Graduate Studies. A structured schedule of supervisory committee meetings will be implemented similar to that in place for the MSc program. The committee will help guide the student through their research by assessing the thesis proposal, the progress of the research, the student's mastery of their field and the scientific method and the readiness of the student to proceed to final defense.

3. Students accepted into the program may be offered sessional instructor positions in undergraduate courses in the Department of Mathematics on a discretionary basis (and subject to availability, and the usual hiring procedures of the Instructor Appointment Committee). These positions will allow the student to hone their teaching skills, to contribute to the academic and research culture of the department, and to build a sense of professional identity and commitment.

4. The program will provide a weekly seminar series (mandatory course for all

graduate students) with graduate students presenting their research projects and invited guest speakers from both Ryerson and the external scientific community. Each PhD student will be expected to provide two seminars (typically during year one and year four of their program). In the first of these seminars, the student will be required to present preliminary research findings by the end of the first year of study, which will be assessed by the student's Supervisory Committee, who will provide the student with feedback in the written form within three (3) weeks from the seminar.

Course Requirements

To pursue the PhD degree, a candidate would elect to study in one of three fields in the PhD program**:**

A. Discrete Mathematics and Networks

This field is supported by the following courses:

AM8101 - Principles and Techniques
AM8102 - Advanced Numerical Analysis
AM8002 - Discrete Mathematics and Its Applications
AM8205 - Applied Statistical Methods
AM8204 - Topics in Discrete Mathematics
AM8208 - Topics in Mathematics
AM8209 - Directed Studies

Proposed new course:
AM9AAA - Advanced Topics in Discrete Mathematics

B. Financial Mathematics:

This field is supported by the following courses:

AM8101 - Principles and Techniques
AM8102 - Advanced Numerical Analysis
AM8001 - Analysis and Probability
AM8205 - Applied Statistical Methods
AM8201 - Financial Mathematics
AM8208 - Topics in Mathematics
AM8209 - Directed Studies

Proposed new course:
AM9BBB - Advanced Topics in Financial Mathematics

C. Biomathematics and Fluids:
This field is supported by the following courses:

AM8101 - Principles and Techniques
AM8102 - Advanced Numerical Analysis
AM8001 - Analysis and Probability
AM8205 - Applied Statistical Methods
AM8206 - Partial Differential Equations
AM8207 - Topics in Biomathematics
AM8208 - Topics in Mathematics
AM8209 - Directed Studies

Proposed new course:
AM9CCC - Advanced Topics in Biomathematics and Fluids

Common Courses:
(a) AM9DDD - PhD Seminar Course
(b) AM9EEE - PhD Research Thesis

A minimum of three one-term course credits beyond the Masters degree will be required for the PhD degree, in addition to successful performance in the PhD candidacy examination and completion of the doctoral thesis and its defence. At the recommendation of the candidate's thesis supervisor and with the approval of the Program Director, one or more additional courses may be required for students with a broader disciplinary background who need additional graduate preparation leading to the candidacy examination. The thesis supervisor, and the candidate's supervisory committee, must approve the course selections or exemptions for each PhD candidate.

Each PhD candidate must submit a PhD thesis proposal. The candidate's thesis supervisor, and the supervisory committee, must approve the thesis proposal. Each PhD candidate must also pass the candidacy/transfer examination (see section 4.4) and the final defence examination of their thesis following completion of the thesis research. The approval of the Dean of Graduate Studies is required in appointing the thesis examination committee, and the appointment of an external examiner. The final defence of the thesis will be a public seminar open to the university community. The Dean of Graduate Studies or her/his appointee will chair the thesis oral examination. The examination committee, including the supervisor and the external examiner, will judge the outcome of the defence and written thesis.

1.4. Mode of delivery

The program will be delivered in the combination of lecture mode (required courses), seminar work, and supervised independent research. The modes of delivery are closely related to the projected learning outcomes and Doctoral Degree Level Expectations.

1.5. Assessment of teaching and learning

Assessment of student achievement of the intended program learning outcomes and Degree Level Expectations will consist of graded assessment (course work), written non-graded assessment of seminar presentations, written and oral candidacy examinations, and the assessment of the doctoral thesis and its oral defence. In addition to the assessments related to individual degree requirements, the Supervising Committee will also provide written feedback in the form of a Progress Report, completed at the end of every term the student is enrolled in the program. In addition to taking account the assessments of aforementioned components, the Progress Report will also provide feedback on the progress of student's thesis research work.

Students will be normally required to achieve B (75% or higher) average and to receive satisfactory assessments on Progress Reports in order to maintain residency in the program. The results of thesis research must be of sufficiently high quality and relevance in the field in order for all the degree requirements to be fulfilled. The forms of assessment and degree requirements are strongly tied to and address all projected learning outcomes and Doctoral Degree Level Expectations listed in the brief.

1.6. Resources and Quality Indicators

Physical Resources

Library Resources

Ryerson University's Chief Librarian assessed the status of the collection for Mathematics regarding the Discipline Assessment for *Mathematical Modelling and Methods*, and provided supporting data regarding the financial support for the collection over the past seven years.

Laboratory Facilities

Over the last five years, Department of Mathematics has invested significant funding in the Ryerson Applied Mathematics Laboratory (RAMLab) in order to develop the infrastructure to support research in all areas of applied mathematics. A leading objective of this laboratory is to encourage exchanges with the scientific community at large. It is characterized by the variety of its multidisciplinary collaborations, with parties working on the development of mathematical models and numerical methods for applications to science and engineering. Special emphasis is granted to the areas of fluid dynamics, financial mathematics, biology, complex networks and signal processing, using a wide variety of mathematical tools (optimization, numerical analysis, dynamical

systems, etc). RAMLab is a place made not only for research but also for training; supervising undergraduate and graduate students from various programs as well as interested research assistants and summer students are a priority. The state-of-the-art equipment available at RAMLab was gratefully financed by NSERC through a "Research Tools and Instruments" Grant.

The size of the laboratory is 288 sq. feet. The lab equipment consists of the following: Dell Poweredge-T105 (server), two Dell XPS/Dimension XPS 720 computers, two Dell Precision T7400 machines, three Dell Precision 690 computers, two Dell Studio XPS 9100 computers, and a Dell-B2375dnf printer. The software in the laboratory is comprised of Debian Linux OS 64bit, seven CentOS 7 licenses, three Maple 16 licenses, one stand alone Windows license, nine Matlab licenses, nine Mathematica licenses, a Microsoft Office license, nine TextMaker Latex installations, nine LaTeX installations, and three Ifort licenses.

Computer Facilities

Ryerson offers many computing and communications services on a university-wide basis through the Office of Computing and Communications Services (CCS). In addition, individual departments and schools have provided specialized services which have been available to graduate students. Currently all Ryerson students and faculty members have access to accounts on the University's network as well as access to drop-in computer labs. Through Ryerson's central computing services, graduate students are provided e-mail accounts, access to university services through its web portal, on-line course materials and communications through Blackboard and access to student web sites. All students have access to MatLAB software for numerical analysis via a university-wide site licence. They are also provided through the library's main portal, web-based access to the Ryerson library catalogue and remote access to Ryerson's on-line, full-text journal publications and databases. Ryerson University possesses institutional licenses for Microsoft Office, SPSS, SAS, RefWorks and Matlab software as well as a variety of digital imaging software such as Adobe Photoshop and Illustrator. In addition, RAMLab has computers available for researcher and student use.

Space Resources

The university has provided space for the Masters students in the Applied Mathematics program since it began operating in 2009, and has continued to provide student work space despite the recognized space shortages at Ryerson University. There is a large office space with two rooms, totalling 673 sq. feet, that can accommodate a total of 25 students including the students (steady state) in the Masters degree in Applied Mathematics, and the 2 PhD students planned for the first year intake. Each student is provided with a study carrel with internet access. As the PhD program grows to 6-8 students, additional office space with 5 additional

student carrels will be required. As the departmental and research activity continues to grow, we will also need additional office space for postdoctoral fellows and visiting researchers.

All of the program faculty have furnished private offices, with hard-wired internet connection. Each researcher has on average 120 sq. feet of dedicated research space. At the present time, the faculty offices are housed in two buildings. The department is also in possession of a conference room, used for departmental meetings, seminars, and graduate courses, whose size is 840 sq. feet.

Financial Resources and Support for Graduate Students

Financial Support for Existing Master's Students

The current average level of support for each Master's student in 2014-15 was $23,000 with approximately 15% of student funding from external scholarships and 5% from faculty research grants. Further, a significant level of student funding (50%) has come from teaching assistantships, with the remainder funded from the university's scholarship resources. The funding policy for the program has been to support full-time program students at a minimum level of $23,000 per year over two years of study through a combination of external and internal scholarships, teaching assistantships and research stipends. Overall, funding for Applied Mathematics students has remained at a competitive level in comparison to the levels of funding at other mathematics graduate programs across the province, and is expected to increase further as new faculty with additional funding opportunities are added to the program

Financial Support for PhD Students

The level of funds, summarized in Table 4, has been sufficient to support the Masters' program, and the funding for doctoral students will be more substantial. It is expected that at least 75% of PhD students will be funded through a combination of University Fellowships, Teaching/Graduate assistantships and faculty-supported stipends as detailed below. The remainder are expected to generate their own funding through external scholarships.

Table 2: Financial Support for Master's Students

Financial Support for Master's Students								
	$ Amount of Support From						Students Funded	
Year	External Scholarship $(#)	Univ Scholarship $(#)	GAs $(#)	RAs $(#)	Other* $(#)	Total	Total[1]	Av $[2]
2014-15	45,000(3)	111,420 (13)	153,240 (17)	0 (0)	8,579.40 (3)	318,239.06**	16 FT**	19,890**
2013-14	30,000 (2)	98,500 (17)	291,095 (19)	6,131.29 (3)	41,999.94 (11)	467,725.95	19 FT(100)	24,617
2012-13	30,000 (2)	129,500 (24)	290,000 (24)	0 (0)	54,790 (11)	474,290	25 FT(100)	18,972
2011-12	30,000 (2)	134,000 (20)	231,500 (22)	0 (0)	43,660 (10)	439,160	22 FT (100)	19,962
2010-11	0 (0)	135,500 (21)	226,000 (21)	0 (0)	34,000 (10)	395,500	21 FT (100)	18,834
2009-10	0 (0)	84,000 (11)	121,000 (11)	0 (0)	0 (0)	205,000	11 FT (100)	18,637

* Stipends via faculty research grants

** Funding through TA/GA for Winter 2015 is not included.

1. all full-time students (1st and 2nd year students)

2. Students may not hold an external scholarship and the Ryerson Graduate Scholarship (RGS) concurrently.

(a) University Graduate Scholarships

Prospective PhD students who are eligible for NSERC Postgraduate Scholarships and Ontario Graduate Scholarships (OGS) will be strongly encouraged to apply for financial support. It is expected that several of the PhD students will receive funding from one of these sources. A centrally funded pool of 6-8 Ryerson Graduate Fellowships, each of the value of at most $16,000 per year will also be available. Each fellowship will be renewable three times for a maximum duration of four years for the PhD program. The School of Graduate Studies Award and Scholarship Committee is the awarding body for these scholarships. The allocation of these scholarships will be on a competitive basis and will be consistent with Ryerson's policies concerning access, equity and research integrity, and the criteria established by the Scholarships and Awards Committee of the School of Graduate Studies.

(b) Graduate Teaching Assistantships

Teaching assistantships will involve delivery of tutorials and grading in undergraduate courses. An Assistant can work normally an average of 10 hours per week over the three terms of the academic year to a maximum of 130 hours per term, or 390 hours per academic year, at the rate of $44.38 per hour, generating additional financial support up to a maximum of $17,308.20.

(c) Faculty Supported Stipends

The remainder of the funding will be provided through faculty supported stipends. Research stipends will be renewable for a maximum period of

four years for the PhD program. The Department of Mathematics will also offer a limited number of $10,000 supplementary awards, which can be used to supplement the research stipends paid by faculty operating grants to a maximum of $17,500 per PhD student per year. Following the implementation of the PhD program in Mathematical Modelling and Methods, it is expected that new or renewed NSERC Discovery grants will reflect the additional support required for PhD students. Other research stipends from research contracts and external sources may also be available to PhD students.

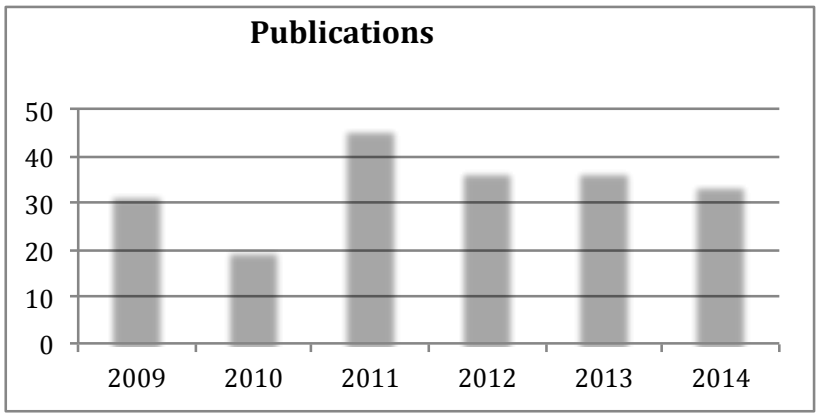
Faculty

The current *Applied Mathematics* graduate program involves a dynamic, vibrant, and accomplished group of faculty who conduct research in a wide range of mathematical disciplines. The faculty members are drawn primarily from the Department of Mathematics. The current complement of 20 faculty members (including the faculty who undertake pedagogical research) and the two new hires that should join the Department in the academic year 2015-16 (one tenure-track position in *Discrete Mathematics and Networks* and one Canada Research Chair, Tier II, in *Financial Mathematics*) are well equipped to supervise the current steady state enrolment of 20 MSc students as well as supervising/co-supervising 7 PhD students enrolled at other universities.

Research Strength

The group of faculty conducting mathematical research in the three fields comprise a highly active, externally funded group who have published over 200 papers in peer-reviewed journals and proceedings in the last 6 years (2009-14). Figure 2 indicates the total number of papers published by the program faculty over the past 6 years. Moreover, the researchers have considerable graduate student supervisory experience, with current and completed supervisions of over 80 Master's students in the Applied Mathematics program as well as other Master's programs. They have also supervised 10 doctoral-level students and 24 postdoctoral fellows.

Figure 2: The number of peer-reviewed publications per year.



Faculty members hold funding from a variety of sources, including NSERC Discovery, Engage, CRD, RTI, OCE TalentEdge, Mprime, and MITACS Accelerate grants. These funds have enabled the Department to support a strong research program with steady support for the growth of facilities dedicated to research as well as both its undergraduate and Master's programs. External research funding in the *Applied Mathematics* program from the granting councils and other peer-adjudicated competitions has achieved an average of over $300,000 dollars per year over the 6-year period (2009-14). The success rate in NSERC Discovery Grant application reached 100% among the faculty who applied in 2014, vastly exceeding the national success rate of 63.7%. This testifies to a sustained and steadily increasing level of external funding received by members of the department. With grants and contracts reaching $487,800 in 2014 (the largest amount in the history of the department and a 30% increase from 2013), the *Applied Mathematics* program has demonstrated a strong level of funding support for the MSc program. The increase in yearly funding levels demonstrates the steady, reliable growth of research within the Department.

Graduate Supervision

Faculty in the Applied Mathematics Graduate program have had significant graduate student supervisory experience with the 11 faculty having completed over 86 Masters student supervisions and currently supervising 25 Masters level students. Four faculty members have or are currently supervising doctoral level students.

1.7. Fields in a graduate program

The focus of the proposed *Mathematical Modelling and Methods* PhD program is to deliver pertinent, practical, timely, and effective education in the three key areas identified by the Department. Each of these domains is widely recognized as having significant and growing societal importance and is in high demand from private and public sector organizations, with applications in the scientific, technology, social, and business sectors.

The current program in Applied Mathematics leads to the degree of Master of Science (MSc). The proposed doctoral program will lead to the PhD in *Mathematical Modelling and Methods* with the following three fields:

1. Biomathematics and Fluids,
2. Discrete Mathematics and Networks,
3. Financial Mathematics.

APPENDICES

A. **Institutional Response to the External Reviewer(s)' Report**

Yeates School of Graduate Studies

Response from YSGS on the
Site Team Report for the proposed PhD
in Mathematical Modelling and Methods Degree Program
Dr. Jennifer Mactavish, Dean YSGS
Dr. Anthony Bonato, Associate Dean YSGS

The site team for the new program proposal in Mathematical Modelling and Methods PhD program consisted of Dr. Derek Corneil (University of Toronto) and Dr. Matt Davison (Western University). The site visit was conducted on July 16, 2015. The site team report was communicated to the Associate Dean, YSGS on July 28, 2015, and the response to the report from Mathematics was communicated on August 3, 2015.

The site team expressed a strong endorsement of the proposed program, referencing its viability, quality of curriculum, and the readiness of the Mathematics department to mount the program. Several recommendations were made to improve the proposal, and these are outlined below.

As mandated by Ryerson Senate Policy 112, what follows is the YSGS-level response to the site team report, and the response to the report from Mathematics. We summarize below the recommendations and responses. We divide recommendations into two broad categories: academic and administrative. The role of YSGS is to provide direct commentary on academic matters, while making suggestions for administrative matters. For simplicity, we supply our responses (as well as a recap of the site team recommendations and Mathematics responses) in the form of tables.

We begin each section with an overview of the major recommendations. Note: the recommendations are numbered in the order that they appeared in the site team report

ACADEMIC RECOMMENDATIONS

Recommendation	**Mathematics response**	**YSGS response**
Recommendation 1: Using large local universities as comparators in the differentiation discussion	The reviewers point out that, even though UOIT and Trent are the only universities in the province with graduate degrees explicitly mentioning Mathematical Modelling in their titles, there are a large number of Ph.D. students graduating in the target areas of the proposal at large local universities, such as University of Toronto, York University, McMaster University,	YSGS supports the program level response. A broader comparison of comparable programs would only serve to strengthen the proposal. Differentiation of the program is a critical piece going forward, and this is reflected in the unique title and positioning of the program within the provincial and national graduate education sector.

	University of Waterloo, and the University of Western Ontario. The Department acknowledges that this is indeed the case and the Appendix B and any other parts of the brief referring to the differentiation of the proposed doctoral program will be revised to emphasize the individual attention provided by the faculty to the graduate students as well as other advantages of a small, well-structured program. The emphasis will also be placed on the interdisciplinary nature of the proposed program and its strong connections to the institutions in the Greater Toronto Area, which foster innovative and interdisciplinary approach to the research conducted within the Department.	
Recommendation 2: Emphasize the opportunities provided to the students by the scientific programs offered by the Fields Institute and Mitacs.	The Department agrees that such opportunities are vital to the success of the proposed doctoral program. Ryerson University is currently one of the sixteen universities affiliated with the Fields Institute and the Department is taking an active part in the administrative and research activities of the Institute. The Department has also benefitted from research opportunities provided by Mitacs in various forms: through graduate internships and the Globalink program, among others. The reviewers note that the departmental annual research reports give a good overview of the awareness of the aforementioned opportunities and the ways in which the Department has taken advantage of them. A summary of the departmental connections with the Fields Institute and Mitacs will be included in the revised version of the brief.	YSGS supports the program level response.
Recommendation 3: Institute a formal checkpoint at the end of the first year of the program.	The reviewers praised the overall logistics of the proposed program and its focus on research. Since the comprehensive examination and the oral defense of the thesis proposal are in the 2nd year of the program, the reviewers felt that a formal checkpoint whose purpose is to identify underperforming	We support the recommendation by the site team of the introduction of a checkpoint; further, we support the program's response describing a presentation on SRC by the student at the end of the first year. However, care should be taken in how such a checkpoint is

	and misdirected students would be appropriate at the end of the 1st year of the program. To this end, the Section 4.3.2 of the brief will be amended to include such a checkpoint in the form of a presentation in the Ph.D. seminar, based on preliminary research findings, which will need to be completed by the end of the 1st year.	delivered. While the checkpoint should not be a formal degree requirement, guidelines should be developed by the Math GPC on what is expected of students at the checkpoint seminar, and mechanisms should be described to provide constructive feedback to students.
Recommendation 4 Addressing measures taken to avoid the drop in the number of female M.Sc. students:	The reviewers have noticed a decline in the number of female students in the M.Sc. program since its inception, from 64% in 2009/10 to 35% in 2014/15 and, assuming that these figures do not simply reflect small sample size, recommended that some explanation and steps, which will be taken to prevent this trend, be given. The reviewers also noted that, in their interaction with graduate students during the site visit, they did not observe any negative aspects of the environment either for female faculty or students. The Department is aware of the lower number of incoming graduate students in the past couple of years, which is also a consequence of a lower number of domestic female applicants to the program, and has proposed measures to address it. One of the principal measures is in the outreach and the recruitment of upper-year female undergraduate students in both programs offered by the Department. To this end, the initiative has been created, in the cooperation with the Faculty of Science, to form the Women in Mathematics group, which would create research opportunities for female undergraduate students, as a part of a larger initiative, Women in Science @ Ryerson. These organizations also provide considerable networking, mentoring and support opportunities for young women in Math, both within the Faculty and beyond. Both the Women in Math and the Women in Science @Ryerson groups are developing programming aimed at connecting with alumni, career development workshops, participation in conferences (such as the annual WISE conference held in Toronto) and other	YSGS supports the program level response.

	activites with the strong support of the Department and the Dean, Faculty of Science. The Department is also working on establishing undergraduate and graduate awards for female students and providing additional support to female graduate students through appropriate platforms (Canadian Mathematical Society, American Mathematical Society, etc.) We would like to point out that the percentage of new female students in 2015/16 has increased to 45% and the Department will persevere in its efforts to see that this trend continues in the future.	
Recommendation 5 Addressing the inconsistency in the Table II (Past Student Employment).	The reviewers indicate that there is an inconsistency in Table II related to the first employment of past graduate students. In this case, the particular issue of concern was the data for 2013, which indicates that there were 8 students who have never had some form of employment and 7 who have been employed. The position of the Department is that the employment data may not be accurate, given the fact that it is, at times, very difficult to obtain the precise information on the employment status of the program alumni due to a variety of reasons. Recently, the Department has increased its efforts to develop its network of graduate alumni and any new information will be added to the brief.	The data provided in the tables of the brief must be accurate, and if there are questions about its validity, then these should be adequately justified within the proposal.
Recommendation 6 Content of the two foundation courses, AM8001 and AM8002.	The reviewers pointed out that some of the content in the two foundation courses in the M.Sc. program reflect the training needs of one of the three main research groups within the program, to the exclusion of the other two. The contents of the current graduate courses, in particular the foundational and required ones, have been discussed at the level of the departmental Graduate Program Council in preparation for the Periodic Program Review for the Master's program in Applied Mathematics, which will be completed during the 2016/17 academic year. The suggestions of the referees are very well aligned with the proposed changes in the core courses. With the growth in the faculty	YSGS supports the program's response. Some clarification by the program should be provided as to the relevance (if any) of these remarks by the site team to the doctoral program proposal.

	complement, the Department is expanding its areas of expertise and a number of new graduate courses are planned. Another measure that was taken during this academic year was the cross-listing of four advanced undergraduate courses, one in every focus area of the program, along with an advanced course in Operations Research. In particular, the topic of algorithms and their complexity will be covered in much detail in MTH814 (Computational Complexity), which is one of the four courses mentioned above. As an additional step, the topic of algorithms and their complexity will be explicitly included in the revised syllabus of AM8002 in Appendix C.	
Recommendation 8: Selective inclusion of curricula vitae included in Appendix D.	The reviewers suggested that the list of curricula vitae attached to the proposal be reduced to the core program faculty, i.e. the faculty members actively involved in supervising and teaching in the existing graduate program. This recommendation will be implemented in the revised version of the brief.	While casting a wider net of faculty members involved in the program is desireable, we support the site team's recommendation of focusing the proposal on those faculty in Mathematics who are actively engaged in supervision. Such faculty should have some record of graduate supervision over the last five years.

ADMINISTRATIVE RECOMMENDATION

Recommendation	**Mathematics response**	**YSGS response**
Recommendation 7: Acquisition of the SIAM journal package.	The Department will continue to work with Ryerson University Library in order to expand the current collection of mathematical research journals and publications, relevant to graduate programs, taking into consideration budgetary constraints.	YSGS supports the program's response.

In conclusion, we thank the external reviewers and colleagues in Mathematics for a very thorough assessment of the strengths and challenges of the proposed Mathematical Modelling and Methods doctoral program. The site visit team's recommendations and Mathematics's responses raise important points regarding the program, and the discussion of these will only have a positive development in the evolution of the program.

Master of Engineering Innovation and Entrepreneurship

Faculty of Engineering and Architectural Science
Ryerson University

Program Proposal

Proposal amended and prepared in conjunction with the Quality Assurance Framework for submission to Ontario Universities Council on Quality Assurance and Ryerson Senate

September 22, 2015

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1. INTRODUCTION

The Faculty of Engineering and Architectural Science (FEAS) at Ryerson University is proposing a new Master of Engineering Innovation and Entrepreneurship (MEIE) Program to begin in Fall semester, 2016. The program is designed for engineering students and industry professionals who are interested in the conversion "technologically promising" research discoveries into innovative and sustainable business opportunities. The main objectives of the proposed cost recovery MEIE program are: to educate the engineering leaders of tomorrow vis-à-vis new venture creation and entrepreneurship; help FEAS to play a leading role in the expansion of Interdisciplinary Innovation Clusters at Ryerson designed to advance and commercialize leading edge engineering research in strategic areas. Provide students with the key knowledge, skills and hands-on experience needed to become effective leaders in the knowledge-based economy supporting economic growth and the creation of prosperity both in Ontario and Canada. The program will prepare students for careers in entrepreneurship, venture capital, new business development and other related fields. This program will also provide students a competitive advantage in industry by preparing them to drive and manage innovation in existing companies to establish new entrepreneurial business ventures.

The proposed Master of Engineering Innovation and Entrepreneurship (MEIE) is a 16 months (4 semesters) long program and consist of 8 courses plus 8 months technology commercialization project. It builds upon Ryerson's institutional strengths in experiential learning, student-led innovation as well as faculty expertise, industry partnerships, and support infrastructure (space and seed funding) in three strategic areas: Biomedical Engineering, Energy and Sustainable Innovation, and Emerging Technologies. These three sectors are experiencing rapid change/growth both in Canada and internationally, and, as a result, are in strong demand from engineering students who want to align their technical skills with entrepreneurial ambition.

MEIE students will have the opportunity to advance their own research, tap into Ryerson's leading faculty-based research, or work on industry-identified customer's challenges. Throughout the interdisciplinary MEIE program, students will be supported by a strong network of experienced business and technical mentors; will work in a collaborative incubator space; and have access to seed funding required to grow their venture. MEIE will support students to develop the skills to create new ventures by designing the legal, technical, and business related structures that form a successful venture. This interdisciplinary program incorporates lecture-based engineering and entrepreneurship courses as well as team-based practicum courses designed to build student capacity to manage projects with critical time demands, regulatory issues and large growth potential.

The MEIE is the only program in Canada that:

(i) Focuses on technology startup's in the field of Biomedical Engineering; Energy & Sustainability and Emergent Technology;

(ii) Is embed the Lean Startup methodology into the curriculum via the three practicum courses;
(iii) Has its own customer centric incubator and accelerator - iBoost Zone - to bring customer's problem for engineering students to develop solution and build a company around it;
(iv) Is led by a faculty with 30 years of industrial experience in technology commercialization and spin out of startups.

1.1. Objectives of the Program

Relationship to Ryerson's Academic Plan: The Master of Engineering Innovation and Entrepreneurship (MEIE) directly impacts and boosts the University's plan to become a comprehensive innovation University, and is strongly aligned with the four key priorities identified in Ryerson's current academic plan (2014-2019).:

1) *Creating student engagement and success through exceptional experiences*

   The MEIE has been designed to "facilitate student-directed initiatives" and "foster an environment in which students are passionately engaged in their own education". Fully half of the MEIE is experiential learning where students will design, develop and market their own business ideas with the support of faculty and advisors. The reports (ex. market assessment, business plans, and prototypes) and presentations (ex. pitches) required of these the final venture project will provide a mechanism to evaluate student performance and will help the students' business advance

2) *Increasing SRC excellence, intensity and impact*

   The MEIE is well aligned with what Ryerson University and the VPRI have identified as "special opportunities" for growth and for a vital exchange of ideas. Faculty will be supported to advance and commercialize their research in a number of ways through FEAS' Centre for Engineering Innovation and Entrepreneurship. Furthermore, MEIE students will seek out faculty members based on their research interests in order to help advance and/or commercialize their SRC activities via MEIE final technology commercialization project.

3) *Fostering an innovation ecosystem*

   The MEIE represents an area to "develop new solutions and apply new ways of thinking" which takes an "entrepreneurial approach to the creation and transmission of new knowledge" in the areas of engineering innovation and entrepreneurship. The MEIE will "open up new channels of ideas and perhaps even new professions" through our efforts to unite students with the theory and experience of entrepreneurship and innovation. The MEIE will create mechanisms to support students' ideas and projects by bringing mentors and external technology entrepreneurs to create synergy focused on innovation and entrepreneurship.

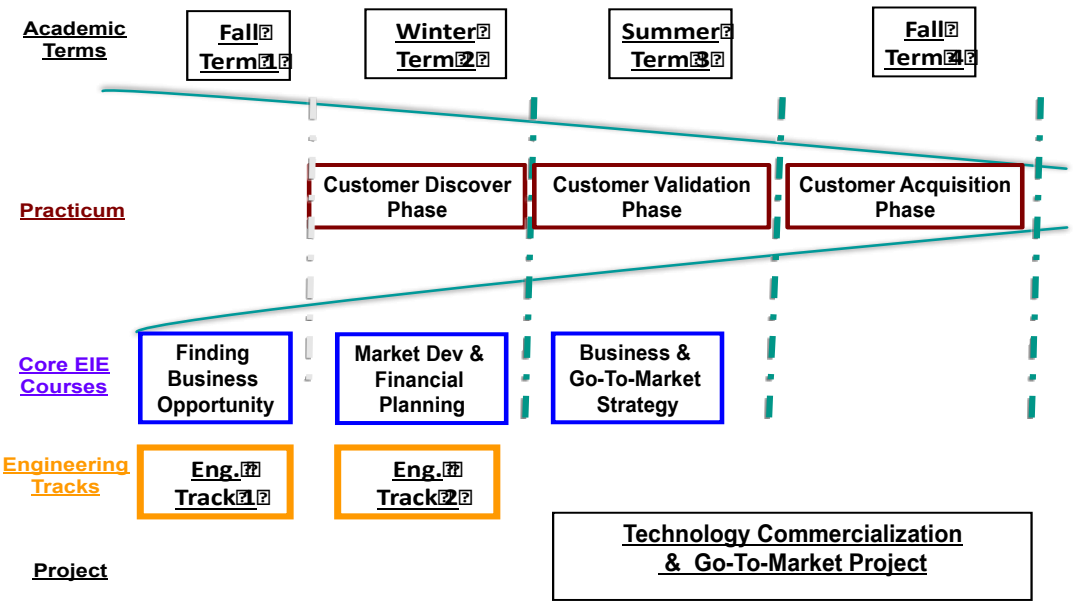
4) Expanding community engagement and city-building

MEIE focuses greatly on expanding student and faculty engagement within the community through mentorship programs, which will be housed from the Center for Engineering, Innovation and Entrepreneurship. The program will develop extensive relationships with Ryerson Alumni from various educational backgrounds and industries to support and enhance each student's journey.

Program Level Learning Outcomes: MEIE's pedagogical approach is reflective of the creative problem solving, fast-paced and high-level of interactivity required to run a technology-based business. MEIE students will be active learners as they advance their ideas by deepening their engineering and entrepreneurship knowledge and applying it through work on team-based start-ups. The program learning outcomes are all based on a unique combination of "Phase & Gate" and the Lean Launch Pad new venture creation methodology. Once the process is described, the learning outcome will become clear and their appropriateness can be established:

The MEIE program is a 16-month (4 semester) during which the students take their new venture creation idea through three distinct phases: customer discovery phase, customer validation phase, and finally customer acquisition phase following to the Lean Launch Pad methodology. This process is called the New Venture Development Process. The New Venture Development Process is similar to processes used in industry for new product development or new business creation. The idea is to manage the risks and the resources while the students are identifying their business opportunity, validating and taking it to market. We aligned these three phases with the three-practicum courses. As shown in the figure below, there are three primary phases/practicums in the new venture creation process that will be used by the MEIE program.

Figure 1: New Venture Development Process



The essence of this new venture creation process is that there is a set of unique deliverables for each phase/practicum. These deliverables have been carefully selected for each phase along the continuum of taking an idea from concept to the market place. These deliverables describe what the students need to know, master, and produce at each phase. It allows the student's practicum instructor to easily assess whether the student has applied all the learning tools required for their successful completion of the phase, as well as identify areas for student performance improvement. Also these deliverables can be directly measured and observed by the student's practicum instructors. At each of the three phases, the information collected and presented by the students is evaluated to determine whether the students have mastered the learning outcome of this phase.

As the MEIE students move the new venture project through the process, assumptions are tested for validity so that the information for each set of deliverables is refined and enhanced. This continuous refinement of the understanding of the new venture moves the project concept from the status of an untested idea at the beginning of the process to an implementable business at the final practicum.

In the Customer Discovery Phase/Practicum of the process, the entrepreneur is trying to evaluate the opportunity without investing significant time or resources. An understanding of the problem to be solved, the nature of the solution, and the target customer groups that can benefit from this solution, are the key deliverables for this phase. In addition to using secondary market research data, it is expected that the students will go out of the building and talk to potential customers to better understand the market niche or the industry they are targeting. The preliminary work associated with this phase will also focus on the competitive situation in the envisioned market(s), the business model and value proposition. The preliminary technical plan should include analysis of intellectual property issues associated with the solution. It should also sketch out all the technical activities needed for achieving proof-of-concept. At the end of the first practicum, the student is evaluated and observed on **Learning Outcomes 1-4** i.e. student's ability to:

1. **Identify and assess technology based business opportunities that solve real customer problem.**
2. **Apply market research tools to assess the market potential for their business idea.**
3. **Apply competitive analysis tools to identify sources of sustained competitive advantage & unique value proposition and integrate into business model canvas.**
4. **Conduct customer interviews to validate customer problems & product solution assumptions and collect and analyze voice of the customer and translate to proof-of-concept requirements.**

In the Customer Validation Phase (practicum), the budding entrepreneurs have to validate the assumptions they made and perform both technical and market feasibility analysis. The main objective is to validate that there are customers willing to pay for their product and/or service. From the market development side, it is expected that thorough primary

market research will be carried out to explore different customer groups, and determine what is the market size? Who are the main competitors? Etc. From the technical perspective, the students are expected to prove that the core technology works and that there is no further invention required. Moreover, using the voice of customer, customer requirements are mapped into technical specifications for the product or services. A plan for the development of the final product is developed. When the market development and the technical proof-of-concept (POC) activities are done, a financial projection is developed. At the end of this practicum the students are evaluated and observed on Learning Outcome 5-6 i.e. student's ability to:

5. **Conduct comprehensive market development analysis and estimate the demand and pricing of their product or service**
6. **Prepare new venture financial and cash-flow projection and capital budgeting**

In Practicum -3 the customer acquisition phase of the process, the knowledge accumulated in the second phase provides the context for an analysis of potential business start-up strategy. The remaining project assumptions are tested and the outcomes are used to formulate the tactical go-to-market approach. The strategic decision process should lead to the development of a fully articulated business plan. The expectation is that the business is either ready to enter the market and raise funds, or the venture is terminated. At the conclusion of this phase, the student evaluated and observed on Learning Outcomes 7-9 i.e. student's ability to:

7. **Develop and evaluate alternative business strategies and chose viable strategy that maximize their sustained competitive advantage**
8. **Develop a comprehensive investor business plan document and pitch**
9. **Develop a go-to-market operating and marketing plan and presentation**

Finally, in the technology commercialization and Go-to-Market project, the students will actually build the minimum viable product (MVP) and tested with lead customers. At the conclusion of the project, the student will be evaluated and observed by a project review committee on Learning outcome 10 i.e. student's ability to:

10. **Develop technology commercialization feasibility and go-to-market reports and presentation.**

These constitute the ten (10) MEIE program-learning outcomes. In Table 1 (below) the MEIE Program Learning Outcomes (PLO's) are listed and checked for appropriateness against Stanford University learning outcomes check list criteria. The test indicates that the MEIE Program Learning Outcomes are clear and appropriate.

(See: http://www.stanford.edu/dept/pres-provost/irds/assessment/downloads/CLO.pdf)

Table 1: Program Learning Outcomes and Stanford Learning Outcomes

	Check List	Describes what students are intended to do, know, produce	Is used to identify areas to improve	Relies on action verbs in future tense	Focuses on students learning outcomes and not teaching activity	Maps directly to curriculum	Can be directly measured and observed
	MEIE Program Learning Outcomes						
1	Identify and assess technology based business opportunities that solve real customer problem	Yes	Yes	Yes	Yes	Yes	Yes
2	Apply market research tools to assess the market potential for their business idea	Yes	Yes	Yes	Yes	Yes	Yes
3	Apply competitive analysis tools to identify sources of sustained competitive advantage & unique value proposition and integrate into business model canvas	Yes	Yes	Yes	Yes	Yes	Yes
4	Conduct a customer interviews to validate customer problems & product solution assumptions and collect and analyze voice of the customer and translate to proof-of-concept requirements	Yes	Yes	Yes	Yes	Yes	Yes
5	Conduct comprehensive market development analysis and estimate the demand and pricing of their product or service	Yes	Yes	Yes	Yes	Yes	Yes
6	Prepare new venture financial & cash flow projection and capital budgeting	Yes	Yes	Yes	Yes	Yes	Yes
7	Develop and evaluate alternative business strategies and chose viable strategy that maximize their sustained competitive advantage	Yes	Yes	Yes	Yes	Yes	Yes
8	Develop a comprehensive investor business plan document and pitch	Yes	Yes	Yes	Yes	Yes	Yes
9	Develop a go-to-market operating and marketing plan and presentation	Yes	Yes	Yes	Yes	Yes	Yes
10	Develop technology feasibility & go-to-market report and presentation	Yes	Yes	Yes	Yes	Yes	Yes

1.2. Admission requirements

Candidates applying to the Master of Engineering Innovation and Entrepreneurship (MEIE) program need to have completed at least undergraduate degree in engineering. As with Masters programs in the Faculty of Engineering and Architectural Science, the minimum grade requirement is at least a B average (equivalent to >73%) in the final two years in courses in the discipline of the engineering track, in which the applicant proposes to do graduate work.

The delivery of the program relies heavily on the synergy/team work created between members of student teams, and successful operation of the program requires that each cohort have an appropriate blend of skills and experience. Therefore each applicant will be interviewed. A strong statement of interest as indicated by the desire and passion for starting a new venture vs. the pursuit of academic master as well good performance in the interview as measured by their ability to communicate their motivation for joining the program, past experience in team work, leadership roles in various activities and dealing with adversity are a critical requirement for admission. In addition, two letters of recommendation are also required. Visa students are also required to demonstrate English language proficiency.

Candidates may be enrolled on a full- or part-time basis. Students are admitted once a year in September. Students will be eligible for scholarships based on the following criteria: academic grades; leadership contribution and financial needs.

1.3. MEIE Program Structure

The MEIE program is comprised of eight (8) courses plus 8 months project. Each course is 13 weeks for 3-hours/ week. The courses fall into three categories:

- 2 Engineering Tracks [term 1-2] – students can select from among a number of advanced engineering course in the track of choice
- 3 Entrepreneurship & Innovation [term 1-3] – these are core courses and must be taken by all MEIE students +
- 3 Lean Startup Practicum [term 2-4] **-** these must be taken in sequence as each represent a specific phase in the new venture creation process

MEIE is a hybrid courses and project-based Masters program. Students will develop a technology commercialization and go-to-market plan over an 8 months time period (within term 3 and 4). The MEIE project will be student-led team based and will have the potential to become a commercial product or a service.

Table 2: MEIE Program Structure

Term	Core EIE Courses	Lean Start Up Practicum	Engineering Tracks and Project
1 (Fall)	Finding and Validating New Business Ideas for Startup		Engineering Track course #1
2 (Winter)	Market Development and Financial Planning for startup	Customer Discovery	Engineering Track course #2
3 (Summer)	Startup Business Strategy and Go-to-Market	Customer Validation	MEIE Technology Commercialization & go-to-market Project
4 (Fall)		Customer Acquisition	

Core EIE Courses (all required):

Finding and Validating New Business Ideas for Startup
Market Development and Financial Planning for Startup
Startup Business Strategy and Go-to-Market

Lean Start up Practicum (all required):

Customer Discovery
Customer Validation
Customer Acquisition

Engineering Tracks/Elective Courses (2 required)
Advanced master courses offered by engineering departments, centers or institutes including the following new courses:

New Course: Biotechnology Start-ups
New Course: Energy Innovation and Entrepreneurship
New Course: Sustainable Entrepreneurship
EI8001: Biotechnology start-ups
BE8001: Foundations of Biomedical Engineering
BE8002: Seminars in Biomedical Engineering
BE8003: Directed Studies in Biomedical Engineering
EI8002: Energy Innovation & Entrepreneurship
EI8003: Sustainable Innovation
DSA1: Design of Algorithms and Programming for Massive Data
DSA3: Management of Big Data and Big Data Tools
DSA4: Data Mining and Prescriptive Analytics
Advanced Methods in Data Visualization (New)
SA8901 Geospatial Data Analytics
Fundamentals of Social Network Analysis for Data Science (New)
ME8118: Engineering Big Data Systems

Social Media Analytics (New)
CP8202:Advanced Software Engineering
MTI8310: Managerial Decision Modeling
DG8001: Foundations of Digital Media
DG8003: Interaction Design Digital Media
DG8004: Digital Media Entrepreneurship
DG8112: Physical Computing

The MEIE Faculty Program Development Committee agreed that the course requirements of 8 courses plus two term projects represented a reasonable amount of work for a four-semester program. This course and workload is consistent with the other course-based M.Eng. programs in FEAS.

The MEIE Program's 6 core courses will all be delivered by a blend of academic and practitioners with many years of industrial experience that practiced new venture creation and hence teach from real world experience. Each course leader uses a variety of delivery techniques that are most suitable to transfer the knowledge to the students at the particular phase of their new venture development. The students' feedback and survey rating is a key indicator of the value of the course and effectiveness of the instructor's delivery mechanism. On the other hand, the three practicum courses are the forcing functions that require the students to put the knowledge they have acquired, and apply the tools they learned, into practice. The effectiveness by which the student meets the deliverables at these practicums is the measure of achieving the program's learning outcome.

Because the MEIE program is experiential, most of the students' learning happens in the market, outside the class, through interaction with customers; investors; business partners; suppliers; mentors; and manufacturers. Students' learning also happens through participation in business plan competitions or tradeshows or attending network meetings. The student's take all this backs to their practicum courses and integrate and synthesis the knowledge in to concrete deliverables.

In the following table, we show mapping of the three EIE and three Practicum core courses Learning Outcomes (CLO's) to Program Learning Outcomes (PLO's).

Note that each of the core courses introduces new concepts/knowledge and tools. Also each course contributes in a major way to a specific set of the program learning outcomes. It is in the final practicum and the project that all the knowledge acquired is synthesized into a business plan and a go-to-market plan

Table 3: Mapping MEIE Course Learning Outcomes to Program Level Learning Outcomes

Mapping MEIE Courses Learning Outcomes to Program Level Learning Outcomes

	MEIE Program Learning Outcomes (PLO's)	1. Identify and assess technology based business opportunities that solve real customer problem	2. Apply market research tools to assess the market potential for their business idea	3. Apply competitive analysis tools to identify sources of sustained competitive advantage & unique value proposition and integrate into business model canvas	4. Conduct a customer interviews to validate customer problems & product solution assumptions and collect and analyze voice of the customer and translate to proof-of-concept requirements	5. Conduct comprehensive market development analysis and estimate the demand and pricing of their product or service	6. Prepare new venture financial & cash flow projection and capital budgeting	7. Develop and evaluate alternative business strategies and chose viable strategy that maximize their sustained competitive advantage	8. Develop a comprehensive strategic business plan document and pitch	9. Develop a go-to-market operating and marketing plan and presentation	10. Develop technology feasibility & go-to-market report and presentation
	Courses Learning Outcomes (CLO's)										
EI8004	1. Understand and practice the creative process of business idea identification, screening and validation	Introduce									
	2. Carry out detailed secondary market research for the new business opportunity and validate the market potential	Reinforce	Introduce								
	3. Conduct competitive analysis and identify sources of sustained competitive advantage & unique value proposition and integrate into Business Model Canvas	Reinforce	Reinforce	Introduce							
	4. Conduct a comprehensive technology development plan that include intellectual property analysis	Reinforce	Reinforce	Reinforce	Introduce						
EI8005	5. Conduct a primary market testing to size the market potential for the product or service	Emphasize	Emphasize		Reinforce	Introduce					
	6. Grasp financial fundamentals needed for business decision making.					Reinforce	Introduce				
	7. understand the various forms of capital and their costs and identify the best sources for their business					Reinforce	Reinforce				
	8. Develop a Financial plan projection for the business.					Reinforce	Reinforce				
EI8006	9. Apply business strategy development tools to choice the best business strategy for the new							Introduce			
	10. Create and practice Business Plan "elevator pitch".							Reinforce	Introduce		
	11. Formulate a Business Plan							Reinforce	Reinforce		
	12. Create an effective investor presentation aimed at securing funding for early stage investors							Emphasize	Emphasize	Introduce	
EI8007	1. Refined value proposition for a unique business opportunity	Emphasize									
	2. How to carry out detailed testing of customer problem & product solution	Reinforce	Emphasize								
	3. Refine Business Model Canvas around the chosen value proposition & market test all the assumption iteratively and close repeatable		Reinforce	Emphasize							
	4. How to estimate market demand and price of the product or service		Reinforce	Reinforce							
EI8008	5. How to conduct CPD to collect voice of customers, using interviews of lead customers, to determine		Reinforce	Reinforce	Emphasize						
	6. How to select minimum viable technology solutions- proof-of-concept and wallowite unit				Reinforce	Emphasize	Reinforce				
	7. How to acquire and demonstrate technology proof-of-concept				Reinforce	Reinforce	Reinforce				
	8. How to estimate cost of goods sold and gross margin for the technology					Reinforce	Emphasize				
	9. Understand how to conduct project budgeting and source capital						Emphasize				
EI8009	10. Prepare a client sales proposal based on the product demostrated value proposition							Emphasize			
	11. Create a sales and marketing plan						Reinforce	Reinforce			
	12. Develop an (tatical) operating plan for the enterprise						Reinforce	Reinforce	Emphasize		Introduce
	13. Develop a go-to-market operating and marketing plan including critical activities and budget						Reinforce	Reinforce	Reinforce	Emphasize	Emphasize

1.4. Program content

In the last 10 years entrepreneurship education has come of age and many universities all over the world are now offering entrepreneurship courses. However, only few of these universities do offer master degree in engineering innovation and entrepreneurship (see Appendix 3). Most of them seek to emphasize the "theory for the sake of practice" approach, and most of them teach the same basic skills needed in every entrepreneurial venture, such as (i) assessing ideas for new venture opportunities, (ii) integrating multi-disciplinary skills and approaches, (iii) Market and product development skills, and (iv) business plan and financial projections skills.

The key and most significant innovative aspects of the content and delivery of the MEIE program that leads the current state of the discipline are as follows:

1. **Three Strategic Engineering Tracks:** advancements in biomedical engineering, energy and sustainability, or emerging technologies promise to transform life, business and the economy.

2. **The Three Phased Lean Startup Practicum** that reinforces and emphasizes the "learning by doing" and disciplined approach of our program
3. **Customer Centric Collaborative Work Space/iBoost Zone:** a Technology Startup incubator space called iBoost will be based on a customer centric model where the customers will be attracted to iBoost Zone to work with students and faculty to solve real problems, hence innovation-by-design. The unique and major differentiation between iBoost and other commercialization Centre's or incubators is that it is student led, customer focused and integrative of all the value chain partners, all focused on the creation of sustainable innovation.
4. **Access to Ryerson's Zones and Innovation Clusters:** students will have access to the expertise, equipment, space and research activity housed within Ryerson's zones and clusters.
5. **Financial resources:** including student scholarships and seed funding to support proof-of-concept development is one of the critical success factors.

The MEIE program simultaneously develops the student's hard as well as soft skills, including:

1. **Communications and Presentation training** is inherent throughout the program as this skill is considered to be a cornerstone for starting a business. Each student is evaluated independently on their communication skills and, when deemed necessary, additional outside training in financials, communication and presentation skills is facilitated throughout the program.
2. **Participation in Business Plan Competitions and Tradeshows** throughout North America will be enabled through the program.
3. **Networking:** students will be exposed to a broad technical and business networks, government agencies and venture capital networks and are encouraged to enlarge their circle of interaction and be proactive in seeking advice, where required, from the same.

The key innovation of this program is the multi-disciplinary student's teams working together to solve real customer's problem. Six of the courses offered are at the 700 levels in addition to a 700 levels technology commercialization project.

1.5. Mode of delivery

The mode of delivery for MEIE is appropriate given the student-led, team based and experiential nature of start-up technology ventures. MEIE will immerse students in both lecture-based as well as lab or studio-style learning environments where they can develop and apply their skills to their business ideas. The MEIE program is unique in that the students' new venture creation practicum and project is the vehicle by which students develop their skills. This provides the student with an experiential learning experience that is grounded in real venture creation that requires dedication, motivation, and passion for success. The character traits developed by the student as they drive the development of their new venture cannot be duplicated in objective-based programs in which the student

does not have a longer term commitment to sustain the drive and passion required for start-up formation and development.

1.6. Assessment of teaching and learning

The appropriateness of the proposed methods for achieving the learning outcome and assessing student achievement: In the table below we provide curriculum mapping of the MEIE program demonstrating its alignment with Ryerson's Degree Level Expectations and showing how individual course level learning objectives align with program learning outcomes and Degree Level Expectations. The MEIE curriculum map below also describe how each of the core courses contributes to particular Program Learning provide evidence of how the student's achievement of the PLO will be measured.

Table 4 clearly show the appropriateness of the proposed program curriculum in achieving the program learning outcome as well as the appropriateness for the assessment of student achievement of the intended program learning outcomes and the Degree Level Expectation.

Table 4: Program Learning Outcomes

	Program Learning Outcome (PLO)	CLO(s) Note 1	If YES - describe, in one or two sentences, teaching done in course(s) which contributes to particular PLO or UDLE, indicating extent to which mastery of the particular outcome is expected to be achieved in this course..	Evidence that students have achieved the particular learning outcome. Indicate what assessments you use to determine the extent to which this outcome is achieved by the end of your course.
1	Identify and assess technology based business opportunities that solve real customer problem	**EIE1**-LO1,2,3,4 **EIE2**-LO1 **LSP1**-LO1,2	The students are introduced to business opportunity (BO) identification process which is biased toward disruptive innovation as well as to a methodology to "Finding Business Opportunity". In addition they are presented with numerous sources of real world customer problems. Also, students self-assemble in teams to brainstorm BO's & selection	In the EIE1 team of students identify and present customer problem that is real and quantifiable and they show that they have the capabilities of solving it in a unique and differentiated way. In Practicum 1 students present the validation of the customer problem and product solution of the business opportunity they are pursuing.
2	Apply market research tools to assess the market potential for their business idea	**EIE1**-LO2,3,4 **EIE2**-LO1 **LSP1**-LO2,3 **LSP2**-LO1	Students are introduced to market research tools and asked to conduct mainly desk research to assess the market potenital size and identify competitiors and competitive offering that solve the same problem.	In the EIE1 the students must submit market feasibility report that identifies the target customers and the potential market size;showing the existence of a sizable opportunity as well as their key competitors.
3	Apply competitive analysis tools to identify sources of sustained competitive advantage & unique value proposition and integrate into business model canvas.	**EIE1**-LO3,4 **LSP1**-LO3,4 **LSP2**-LO1	Students are introduced to techniques to identify their business' unique value proposition and sources of sustained competitive advantage. Also, they're introduced to the technique of developing their business model canvas. The students work in teams to exercise the develpoment of their business model canvas and identify and test hypothesis.	When the students submit their business model canvas. The business model canvas identifies the offering value proposition and its target customers; channel and relationship to customer; the key resources and activities and key partners. Sources of revenue and uses of fund are also identified. Also, when the students present the competitive landscape and their unique advantage.
4	Conduct customer interviews to validate customer problems & product solution assumptions and collect and analyze voice of the customer and translate to proof-of-concept requirements	**EIE1**-LO4 **EIE2**-LO1 **LSP2**-LO1,2,3	Students are introduced to and practice how to conduct lead customer validation in their target markets through primary research. Students are also introduced to competitive technology analysis and evaluation techniques and how to collect voice of the customer and translate it to proof-of-concept criteria. Students are also introduced to prototyping options and user-centered product interface design fundamentals. The basics of conducting a usability study are reviewed. Project management techniques are used by students to develop the proof-of-concept project plan for their enterprise.	Students submit three asiignment that describe shaping the product offering to disrupt the market; a preliminary analysis of the competitive landscape and competitive technologies and developing the proof of concept criteria. These dosuments are the foundation for develoing the proof-of-concept plan and to conduct customer validation via primary research. The instructor grades the students effort through an iterative process of feedback and refinements. Students submit a proof-of-concept project plan and evalution document to the instructor.
5	Conduct comprehensive market development analysis and estimate the demand and pricing of their product or service	**EIE2**-LO1,2,3,4 **LSP2**-LO2,3,4	Students are introduced to market segmentation techniques to help them have a deeper and more granular understanding of their adressable market, differentiate between the various customer categories, e.g. early adopters vs. mainstream customers. They also learn the techniques on how to extract price sensitivity vs market demand and how it affects their business strategy. The students are also taught how market demand for novel products affects both their price and cost structure and how to use profit maximization techniques to select the optimum production level.	Students have to conduct a detailed market analysis, with a detailed testing plan, outlining both qualitative and quantitative results, and an in-depth statistical analysis of their collected data. key outcomes of these assignments is the addressable market size and its impact on the business strategy, the product/service pricing, the sales channels, and the achievable gross margins.

6	Prepare new venture financial & cash flow projection and capital budgeting	**EIE2**-LO2,3,4 **LSP2**-LO2,3,4 **LSP3**-LO2,3,4	Students are first introduced to the concepts of "cost of capital" and how it affects both their ability to grow as well as their net profit margin and future market valuation. Next, they're taught how to read and develop from the ground up the 3 key financial statements, the Balance Sheet, the Income Statement and the Cash Flow statements, and how to use those statements to make strategic and tactical business decisions.	In the EIE2 course assignement, the students are asked to develop a 5-year Financial Plan, that comprehends the results of their market analysis plan, their pricing and cost structure, and their business model. The Financial plan must include the Balance Sheet, Income Statement and Cash Flow on a monthly schedule for the first 12 months of operation, and on quarterly schedule for the following 4 years.
7	Develop and evaluate alternative business strategies and chose viable strategy that maximize their sustained competitive advantage	**EIE3**-LO1,2,3,4 **LSP3**-LO1,2,3,4	Students are introduced to business strategy development techniques and exposed to the types of venture partners and alliances that might be beneficial for venture successes. The students are asked to apply and present the application of these techniques to their new venture. Feedback and comments is class help the students refine their business strategy analysis and choice.	In EIE 3 students are asked to present the results of the application of SWAT/5 Forces and decision matrix analysis for their new venture and receive feedback and suggestion. In LPS3 one of the three deliverables is business strategy analysis and discussion presented by the students to the instructor. Example; for a start up most students usually chose between a stand alone business; partnership or licencing their technology. The application of SWAT and 5 Forces point them to the startegic choice that give them maximum sustained competitive advantage.
8	Develop a comprehensive strategic business plan document and pitch	**EIE3**-LO2,3,4 **LSP3**-LO2,3,4	Students are introduce to the preliminary steps to lay the ground work for the creation of an effective business plan and to understand the difference between a tactical business plan and one aimed at investors. Then they are asked to draft a business plan for their venture. Through an iterative process and one-on-one discussions/feedback the students evolve an effective business plan. The students create and present in class and to invite VC an elevetor pitch; and investor presentation and get valuable feedback for refinements.	in EIE3 the students create a business plan document, elevetor pitch and investor presentation that is critiqued by other students and invited guest from the investor community. In LSP3 the second deliverables is a presentation of a business plan that is rated by the student and instructor for completiness and effectiveness. Also the students must submit a business plan document to their instructor and judging its quality.
9	Develop a go-to-market operating and marketing plan and presentation	**EIE3**-LO4 **LSP3**-LO4	Students are introduced to sales and marketing strategies and taught how to make client calls and prepare client presentation and practice these in class. Students also learn the art of negotiation and exercise it. Also they are introduce to how to create effective marketing and operating plan.	in the module the students deliver client proposals, sales and marketing plan documents and presentations. As well as an operating plan that are marked by the instructor for practicality and details. In tollgate III the third delievrables the students present the marketing and operating plan to their advisory committee that conclude if it pass.
10	Develop technology commercialization & go-to-market report and presentation	**LSP3**-LO3,4	Students are introduced to technology commercialization and management approaches. Students assess technology go-to-market readiness using industrial tools. The students has 8 month to mature the technology and engage the customers for feedback. Through iterative process the students learn the process of taking the technology to market .	In Practicum #3 and the 8 months project the students must prepare and present a technology commercialization readiness assessment and a go-to-market plan. These will be presented to the Project Review Committee and evaluted for appropriatiness and completiness.

EIE1=EI8004 course; EIE2=EI8005 course; EIE3=EI8006 course; LSP1=EI8007 course; LSP2=EI8008 course and LSP3=EI8009 course

University Degree Level Expectation (UDLE) (Note 2)

Depth and Breadth of Knowledge
Research and Scholarship
Level of Application of Knowledge
Professional Capacity/Autonomy
Level of Communications Skills
Awareness of Limits of Knowledge

Note 1 Insert number of the particular course learning outcome (CLO) which leads to the specified PLO or UDLE: if more
Note 2 Detailed descriptions of the UDLEs are given in file: Ryerson's University Degree Level Expectations

Degree Graduation Requirements: The degree graduation requirements for a Master of Engineering Innovation and Entrepreneurship (MEIE) program will be generally similar to other professional masters programs offered by the FEAS, however as this program is a fast-paced and market focused hence it will be aimed at highly motivated students with demonstrated leadership abilities.

To complete the requirements of the MEIE program, students will require a total of eight course credits and two credits for a project. Students must complete three (3) core engineering innovation and entrepreneurship (EIE) courses, three (3) core lean startup practicum (LSP) courses, and two (2) engineering tracks courses with a minimum of B-. In addition the students must satisfactorily complete an eight (8) month project supervised by a faculty and assessed by a review committee.

Each course has a set of deliverables and assignments that students must complete. These deliverables are aligned with the course learning outcomes. The instructor assesses these deliverables and assignments as to the student's knowledge, comprehension, application, analysis, synthesis and evaluation of the new concepts and tools that are introduced in the course are then assessed to measure the student's level of understanding and proficiency in applying them. As a rule, all assignments and deliverables are related to the student's new startup. In addition to assessing the students at the course level, as the students put the knowledge they learned and apply the tools they acquired into practice on their project they are assessed again at the completion of the project by a review committee chaired by their project supervisor. This is a key step in assessing the student's effectiveness in applying the knowledge acquired to achieving the program learning outcomes. Evaluation of individual vs. team contribution is an essential component of measuring each student's level of performance and adequacy of achieving the learning objectives.

The ability to effectively work in a team environment is an important learning outcome of team based entrepreneurial project. However, a policy and procedure will be established and communicated to assure fair assessment of individual team member contribution. Some of the, courses and practicums, assignments will be marked on individual contribution bases, but others will be team based. A suggested mechanism for handling individual and team-based evaluation in the courses, practicums and projects will be modeled after evaluations that are done in industry using tools such as a 360-degree evaluation. Team member evaluations will be based on instructor input plus team member's feedback (collected in confidence). Rating of performance will be based on peer evaluation forms that are designed to qualitatively capture direct contributions to assignment and interpersonal interaction within the team. These mechanisms have been successfully applied at McMaster University team based entrepreneurship program.

Regarding intellectual property ownership and equity in value creation – very early on teams will asked to develop and sign shareholder agreement that stipulate the terms of equity distribution, vesting schedule, exits, IP assignment, .etc. We will seek assistance from Legal Innovation Zone and OVPR&I to educate students in regards to IP ownership and also provide students with resources to help them understand valuation and startup economics. Assistance will also be sought to help protect the interest of all parties through

proper legal agreements.

Again, we believe that the proposed program does provide the students with all the tools necessary to navigate into the complex world of technology-based new venture creation. The applications of these tools by the students on their unique project allow them to develop the analytical and interpretative skills require by a graduate programs. In addition the required documentations at each practicums and presentation to their supervisory committee will provide amble opportunities to assess the individual contribution of team members.

In the first term, two graduate level courses will be introduced [EI8004, and first Engineering track] providing overview of technology startups and business opportunity identification in the chosen track. In this term the students will be heavily involved in developing a number of critical soft skills such as communication and presentation, self-assessment, team rule, interactive/interpersonal skills as well as leadership development. All courses are instructor led.

In the second term, three graduate level courses will be introduced [EI8005, EI8007 and second Engineering track] providing in depth assessment of technology startup market and financial feasibility, customer discovery practicum and development of proof-of-concept.

In the third term, two graduate level courses will be introduced [EI8006 and EI8008] and the project will commence providing knowledge on startup business and go-to-market strategy development, customer validation practicum and starting the 8 month long team based project. The project will be faculty supervised.

In the forth term, the students' teams continue working on the project supervised by a faculty, and will complete the last Lean Startup Practicum [EI8009]. They will complete the program by presenting their results of their project to a review committee consist of academics and business faculty.

1.7. Resources for the proposed program

Infrastructure: Minimal additional resources are needed for the program in terms of infrastructure.

Faculty and Professional Resources: At steady state we expect student's enrolment to reach a total of 60 (new and returning students). The program will require the following resources: (i) program coordinator (ii) a business development manager (both are staff positions) and (iii) initially one full time Faculty hire (will be from within Ryerson from various departments or externally), this will increase up to three Limited Term Faculty (LTF) hires when enrolment reach steady state. Faculty hiring decision will be contingent on student's enrolment level and market demand. There are a number of faculties that the program can leverage with the right expertise these are shown in the table below:

Table 5: Faculty Resources

Faculty Name & Rank	*Home Unit*[1]	*Supervisory Privileges*[2]
Category 1		
RFA Faculty Member *(to be filled)*	*FEAS*	*Full*
RFA Faculty Member *(to be filled)*	*FEAS*	*Full*
Category 5		
R. Loutfy *– Adjunct Professor and Director, Centre of Engineering Innovation & Entrepreneurship, FEAS, Ryerson*	*FEAS*	*Full*
Dan McGillivray *– Director, Centre of Urban Energy, FEAS, Ryerson*	*FEAS*	*Full*
Deborah de Lange – *Assistant Professor, Business Strategy, Ted Rogers School of Management (Engineer), Ryerson*	*TRSM*	*N/A*
Lotfi Belkhir *– Associate Professor, Eco-entrepreneurship, McMaster University*	*External (McMaster)*	*N/A*
Category 6		
Steve Treiber- *Principle NEXI Inc., teach Entrepreneurship, University of Toronto*	*External (UoT)*	*N/A*
Ela Borenstein, *BDC, Healthcare Fund, Sessional Lecturer*	External (BDC)	*N/A*
Greg Roberts, *CEO Carlyle Capital, Sessional Lecturer*	External (VC Firm)	*N/A*
Tom Turchet, *Sales and marketing sessional Instructor at McMaster University master of engineering entrepreneurship program*	External (Sessional)	*N/A*

Category 1: tenured or tenure-track core faculty members whose graduate involvement is exclusively in the graduate program under review. Membership in the graduate program, not the home unit, is the defining issue.

Category 5: other core faculty: this category may include emeritus professors with supervisory privileges and persons appointed from government laboratories or industry as adjunct professors.

Category 6: non-core faculty who participate in the teaching of graduate courses.

Additional Faculty and Professional Resources: Technical Mentors (subject matter experts) and Business Mentors play a key role in the MEIE program. The roles are:

Technical (subject matter expert) Mentors

In addition to the core faculty and lecturer participation, the MEIE program has a Technical subject matter expert Mentor for each team of students. The CEIE Mentorship Program is a face-to-face mentoring program, whereby mentors and entrepreneurs are matched to establish an ongoing technical mentorship relationship throughout the duration of the student's Project Development. Technical mentors are made available to MEIE students only and are a mandatory component of the project development. The role of the technical mentor is to guide the student through the technical knowledge component of the project. The mentor is the main point of contact the technology commercialization (technology proof-of-concept) whilst dealing with technical questions throughout. Students are expected to meet with their technical mentors no less than once every week, especially in the early stage of the project.

Business Mentors: The role of the Business Mentor is to provide specialist assistance, especially with respect to the business aspect of the student project. The business mentor may also be a critical person for the student to consult in terms of market opportunities for the product/company. The business mentor is available to the student for approximately 10-20 hours over the course of the project. Students are encouraged to arrange regular meetings with their business mentor.

Supervision: In addition to the above, the following is a list of current Ryerson Engineering faculty members who are interest in being involved as project supervisors/technical mentor for the MEIE program:

Habiba Bougherara, MIE
Ayse Bener, MIE
Mark Towler, MIE
Patrick Neumann, MIE
Joseph Chow, CE
Medhat Shehata, CE
Yaser Dahman, CHEM
Mathew Kyan, ECE
Xiao-Ping Zhang, ECE
Farhad Ein-Mozaffari, CHEM
Krishna Kumar, AERO
Bala Venkatesh, ECE
Sridhar Krishnan, ECE
James Smith, ECE
Ebrahim Bagheri, ECE
Victor Yang, ECE
Hossein Rahnama, ECE

Financials: At steady state (with 35 new students joining the program and 30 returning from prior year) the revenue from student's fee is estimated to be approximately $750K (Total F/T CND or permanent resident student's fees are $20K; Visa student's fees are $30K, for the 10 credits). The total payroll including benefits plus operating expenses and indirect cost at steady state is estimated to be $563K. Therefore the program will be self-funded and sustainable. If the projected enrollment numbers are reached, the program is expected to break-even in its second year of operation.

The University office of Planning (UPO) has conducted a program costing based on the data provide by FEAS. UPO have indicated that from a costing perspective the proposal can proceed.

Space and Laboratory Access: Room allocations, including specialized teaching and laboratory space, are available through the Faculty of Engineering and Architectural Science and across campus and will be administered through the Dean's Office. Masters courses will be offered after hours i.e. at 6 pm to accommodate part time students. Further, laboratories, conference rooms and resources shall be made available from the Centre for Engineering Innovation and Entrepreneurship.

Ryerson Library Resources Collections: The Ryerson Library hosts over 600,000 monographs in electronic, print, audio and video form, subscribes to well over 56,000 online journal subscriptions and provides access to over 200 online databases that contain full text articles, abstracts, images, historical documents, global news sources and datasets. All told, the acquisitions budget totals over $4.4 million dollars.

The collection development philosophy is very much holistic in its intent. In response to the rise of interdisciplinary studies in the academy, the Library has ensured that librarians engage in collection development not motivated by strict subject silos, rather by the needs of all program areas. Collection decisions are made to improve resources for all users. Making new acquisitions available is the priority, and there is less concern about which subject area should pay for it. This has made the Library nimble in identifying areas in need of strengthening and lessening the bureaucracy involved in making collection decisions. All efforts are made to fulfill requests of faculty and students, within reason.

Similarly, a committee comprised of librarians representing all subject areas gets requests for new serials and electronic resources. The committee considers all requests and approvals are granted based on a myriad of factors, including usability, cost, access, and relevance to programs of study at Ryerson.

Where at all possible, the Library works with national and provincial consortiums, the Canadian Research Knowledge Network (CRKN) and the Ontario Council of University Libraries (OCUL) to negotiate licenses for electronic resources. This increases purchasing power, and allows for assurance that the content purchased is archived in perpetuity on servers housed at University of Toronto via the Scholars portal initiative.

Interlibrary Loans: The Interlibrary Loan (ILL) service allows users to borrow items and obtain articles from other libraries through our ILL staff, if the Ryerson University Library does not own materials. This service is provided free of charge.

One of the most critical resources for the MEIE program is access to Business Intelligence resources from MaRS Discovery District. Arrangement does exist between Ryerson and MaRS that will enable MEIE students to access market research reports and entrepreneurship Toolkit's.

In the Faculty of Engineering & Architectural Science, **knowledge made tangible** is our mission. **High-quality education** that prepares graduates for today and tomorrow's workplace is our motto. **Rigorous research** that answers society's most pressing questions; and t**echnological innovation** that boasts our economy and improve the quality of life for Canadian is our way of work. All this speak loudly that the FEAS is the right home for the MEIE program as the climate in the FEAS promote innovation and foster appropriate level of intellectual pursuit.

Administrative duties: The CEIE director will be responsible for program admissions, policy, fund rising; curriculum oversight, scholarship allocations and examination requirements as needed. CEIE staff to help the director in day-to-day operations is included with the Centre of Engineering, Innovation and Entrepreneurship. The available technical support

1.8. Quality and other indicators

There are five key components required to run a successful MEIE program. They are as follows:

1. **Quality Students:** availability of scholarship can help attracting the best students
2. **Quality Delivery:** by a blend of academic and seasoned practitioners with teaching abilities
3. **Collaborative Work Space:** availability of a space conducive to collaboration and collision of ideas, creativity, innovation and talented engineers that can attract lead customers
4. **Seed funding:** availability of a pool of fund to seed student's development of proof-of-concept
5. **Commitments from technical & business mentors:** availability of quality technical subject matter experts and business mentors to guide the students during their entrepreneurial journey.

MEIE will be led by the Director, Centre for Engineering Innovation and Entrepreneurship and housed within the Dean's Office, Faculty of Engineering and Architectural Science. Faculty, highly qualified and current in the track areas, as well as experts practitioners with experience in technology business development and investment will deliver the MEIE courses.

Once the program is implemented and delivered, in addition to standard university quality assurance processes, the following quality indicators will be measured:

Time to completion: The MEIE program is not only a course based-program but also a technology commercialization and go-to-market project based and **completing the project** is the controlling factors for student's completion of the degree. Since the students are working on the creation of real businesses, the research and collection of data can partially depend on external factors not in the student's control and hence could delay the student's graduation. However, the shortest time to graduation is 16 months for full time and visa students and part-time students can take 32 months (i.e. twice as long).

MEIE program flow through data will be one of the key quality indicators and our target is >75% of the F/T students will finish in 4 terms and >75% of P/T students will finish in 8 terms.

Another quality indicator is enrollment, withdrawal and graduation our target is to increase enrollment 20% per year, keep dropout to <10% of enrolled students per year and graduate >90% of the students.

Experiential learning: The experiential and hands-on approach of the courses, practicum and the project is the key feature of the program and should be highly valued by the students and is excepted to be a big draw to the program. Our target is that >90% of our graduates would recommend the program to those interested in pursuing career in high tech business.

Student satisfaction survey results: The Centre for engineering Innovation and Entrepreneurship is committed to offering the highest quality graduate-level programs designed to meet the needs of aspiring entrepreneurs. Central to this commitment is the goal of continuous improvement. Student's course evaluation will be conducted and retrospect session will take place with the instructor to determine areas of improvement. Two critical area of focus are students rating of (i) course value and (ii) instructor effectiveness. Our target is >90% student satisfaction with both. We will also conduct a comprehensive independent market research survey after the 5th year of operation to measure the effectiveness of the MEIE programs in relation to its founding objectives. The full survey, method and results will be made available to the Dean.

Other Indicators of Program Quality: MEIE students will be encouraged to enter into Business Plan Competitions to test their skills and earn from others competitors. Our target is that 50% of our students will enter business plan competition. Also MEIE students are encouraged to form their own companies and raise capital to advance their enterprise. This is a critical test if external investors are willing to back the student's idea. Our target is that 15% of our students will raise capital during their technology commercialization project.

Entrepreneurship, employment, post-graduate status: Our expectation is that the majority (>70%) of graduates will be employed full-time in private businesses within a six month of graduation. Some <20% will pursue higher degrees. The rest will work for large corporation.

APPENDICES

A. Institutional Response to the External Reviewer(s)' Report

Yeates School of Graduate Studies

Response from YSGS on the
Site Team Report for the proposed graduate program
Master of Engineering Innovation and Entrepreneurship
Dr. Jennifer Mactavish, Dean YSGS
Dr. Anthony Bonato, Associate Dean YSGS

The site team for the new program proposal in Master of Engineering Innovation and Entrepreneurship (MEIE) graduate program consisted of Dr. Teresa Menzies (Brock University) and Dr. Stephen Neville (University of Victoria). The site visit was conducted on July 21, 2015. The site team report was communicated to the Associate Dean, YSGS on August 17, 2015, and the response to the report from the MEIE program team was communicated on August 21, 2015.

The site team expressed a strong endorsement of the proposed program. They cited that the MEIE program is well-aligned with the strategic goals of Ryerson and FEAS, its curriculum and learning outcomes are appropriate, and its model of delivery will have the intended transference of entrepreneurial knowledge and skills. Several recommendations were made to improve the proposal, and these are outlined below.

As mandated by Ryerson Senate Policy 112, what follows is the YSGS-level response to the site team report, and the response to the report of the MEIE team. We summarize below the recommendations and responses. We divide recommendations into two broad categories: academic and administrative. The role of YSGS is to provide direct commentary on academic matters, while making suggestions for administrative matters. For simplicity, we supply our responses (as well as a recap of the site team recommendations and MEIE responses) in the form of tables.

Note: the recommendations are numbered in the order that they appeared in the site team report.

ACADEMIC RECOMMENDATION

Recommendation	**MEIE response**	**YSGS response**
Recommendation 4: Policy and procedures relating to teamwork need to be developed and communicated to program participants for grading of coursework, core practicum and the project, with clear agreement regarding of IP ownership	The ability to effectively work in a team environment is an important learning outcome of team based entrepreneurial project. However, a policy and procedure will be established and communicated to assure fair assessment of individual team member contribution. Some of the, courses and practicums, assignments will be marked on individual contribution bases, but others will be team based. A suggested	The program response is appropriate. We suggest adding language in the program proposal as described in the response.

	mechanism for handling individual and team-based evaluation in the courses, practicums and projects will be modeled after evaluations that are done in industry using tools such as a 360-degree evaluation. Team member evaluations will be based on instructor input plus team member's feedback (collected in confidence). Rating of performance will be based on peer evaluation forms that are designed to qualitatively capture direct contributions to assignment and interpersonal interaction within the team. These mechanisms have been successfully applied at McMaster University team based entrepreneurship program. Again, we believe that the proposed program does provide the students with all the tools necessary to navigate into the complex world of technology-based new venture creation. The applications of these tools by the students on their unique project allow them to develop the analytical and interpretative skills require by a graduate programs. In addition the required documentations at each practicums and presentation to their supervisory committee will provide amble opportunities to assess the individual contribution of team members.	

ADMINISTRATIVE RECOMMENDATIONS

Recommendation	**MEIE response**	**YSGS response**
Recommendation 1: The site team suggested that the program be fully funded by the province, based on the innovativeness of the program.	We agree that this is an innovative and unique program but feel that it being a cost recovery program is integral to the essence and intention of the program.	The program is full cost recovery, and in this form, has the support of FEAS and YSGS.

Recommendation 2: The heavy emphasis on practitioner instructors. The reviewer's believe that there should be a blend of practitioner with a strong cadre of academic or academic with practical experience, instructors.	We agree with the reviewer's that a proper blend would add to the rigor and credibility of the program, we will address this through the two new planned hires as well as the association and collaboration with TRSM entrepreneurship program and having member of their faculty delivering one or more of MEIE core courses. It should be noted however, that (i) we believe using instructors that are practitioner is an important feature of the program as it has been shown that many entrepreneurial programs fail because instructors don't have the practical first hand experience starting a company; and (ii) many of our instructors are academics with past industrial or startup experience.	We encourage FEAS and those in other faculties provided teaching support (such as TRSM) to assign RFA members to teach and supervise in the program, and have such teaching count as a faculty member's regular teaching assignment (that is, as non-overloads).
Recommendation 3: The number of tenured or tenure track FEAS or TRSM instructors should be increased to enhance the rigor and credibility of the MEIE program, both within the university and in the wider arena.	This will be addressed through the addition of two full-time faculty positions that is called for in our proposal and baked into our financial costing reviewed by the office of planning.	The priority for new faculty hires would come from the Deans of FEAS and TRSM.
Recommendation 5: Any grey area, where students feel they are being financially disadvantaged due to the success of their product/service idea, should be covered by policies and procedures that are fair and clearly communicated to all stakeholders when they commence their involvement in MEIE program activities.	Very early on teams will asked to develop and sign shareholder agreement that stipulate the terms of equity distribution, vesting schedule, exits, IP assignment, .etc. We will seek assistance from Legal Innovation Zone to protect the interest of all parties.	YSGS supports the program response.
Recommendation 6: The uncertainty about how faculty who support the MEIE program and its students get recognized/compensated for their effort.	We will work with the Vice Provost - Faculty Affairs in determining the right level of overload teaching and project supervision compensation. Also, in this case we apply other models such as overload compensation for MEng	We suggest that the program team work not only with the Vice Provost – Faculty Affairs, but with the Deans of the respective faculties along with the Department chairs on this recommendation.

	projects in Computer Networks and Capstone design projects at undergraduate level.	

In conclusion, we thank the external reviewers and colleagues in the MEIE program team for a very thorough assessment of the strengths and challenges of the proposed Engineering Innovation and Entrepreneurship graduate program. The site visit team's recommendations and the MEIE team's responses raise important points regarding the program, and the discussion of these will only have a positive development in the evolution of the program.

Dr. John Turtle
Secretary of Senate
Ryerson University
350 Victoria Street Toronto, ON, M5B 2K3

Dear Dr. Turtle,

Re: New Professional Master's Diploma Program Proposals

The Ted Rogers School of Management has developed four new Professional Master's Diploma programs (PMDips). These PMDips will help to grow the suite of offerings that compliment TRSM's MBA programs. The new PMDips are as follows:

- Skills for Success for International Students joining Canadian MBA Programs
- Chartered Professional Accountant
- Certified Financial Analyst
- Finance and Social Innovation

Program proposals were developed in compliance with the Senate-approved framework for PMDips. Full program proposals were reviewed by YSGS Council on May 14, 2015 where the programs were reviewed, discussed and then recommended for approval by Senate.

With the approval of Senate at the October 6, 2015 meeting, these proposals can move forward to MTCU to attain approval for a fall 2016 launch.

Sincerely,

Dr. Jennifer Mactavish
Dean, YSGS

Ryerson University
Program Proposal Brief of the

Professional Masters Diploma in
Skills for Success for International Students joining Canadian MBA Programs

Submitted to the
Ontario Universities Council on Quality Assurance

1. INTRODUCTION

1.1. Objectives of the program

The Professional Masters Diploma in *Skills for Success for International Students joining Canadian MBA Programs* is intended to prepare graduates to be successful in Master of Business Administration Programs in Canada. International students can be disadvantaged due to unfamiliarity with MBA classroom norms of experiential learning, and lack of familiarity with Canadian Business History and Canadian industry. Upon graduating, PMD holders can expect enhanced performance in a North American MBA program. It will provide students with knowledge of the Canadian business environment and history, and the skills necessary to succeed in Canadian MBA programs that emphasize active, experiential learning, as well as specific written and oral communication skills.

This Diploma will be designed primarily as a requirement for admission for International Students who will be joining one of Ryerson's two MBA Programs, see Appendix 1. However, two other types of students may also apply for the Diploma. The first are students who have not yet gained admittance and are trying to improve the quality of their application for Ryerson's MBA, and the second are students who are considering other MBA Programs.

Many post-secondary degree holders struggle to cope with a difficult job market, the Ryerson MBA Program focuses on career-readiness from the outset, and has a proven track record in providing access to lucrative post-MBA employment in a variety of fields. Ryerson's MBA Programs are designed to create business leaders who are responsive to emerging trends and the immediate demands of the marketplace, with a social conscience. This approach combines strong academic foundations with experiential learning practices to help students gain the leadership skills, expertise, and confidence they need to achieve professional success. The Ryerson MBA has

International students are required to maintain full time status as students as part of their visa requirements. The PMD will be completed in one term, full time, consisting of four courses and a capstone project. The first Diploma course will be available in the spring/summer of 2016, and run annually in the spring/summer term. The Ryerson MBA program has seen a year-over-year increase in international student enrollment of 21.5% since 2010, which emphasizes the growing need for this program. This program is intended to be cost recovery.

1.2. Admission Requirements

- Completion of a four-year Bachelor of Arts degree from a recognized university.
- A minimum B (73% or above) average in the last 2 years of university study (Including post graduate university programs).

- A GMAT score. The average score for the 2015 MBA class was 620 and scores ranged from the Program's minimum of 550 to 740. GMAT scores are valid for five years after test examination date. Highest valid GMAT score will be used for consideration for both the MBA and the PMD.
- An English language proficiency score for applicants who have degrees from institutions in which English is not the language of instruction or examination. The minimum score requirement for the Ryerson MBA program is: TOEFL: 100, IELTS: 7.5, MELAB: 90, PTE 68.
- Minimum of two years full-time post-graduate work experience.

These admission requirements are consistent with the requirements for admission to the Ryerson MBA Programs. For evaluation of foreign academic credentials if the applicant does not have the undergraduate degree requirement, applicants must submit their application complete with translated and notarized copies of all their academic transcripts and credentials.[i] Candidates for this Diploma will include International Students who have gained conditional admittance to the Program upon completion of the Diploma.

Alternate requirements will include International Students who are working towards admittance to Ryerson's MBA, who meet all or most of the requirements for admission. These candidates will need to have completed an undergraduate bachelor's degree prior to joining the Diploma Program, and meet the work experience requirements. They may complete their GMAT while enrolled in the PMD. In some cases, students with otherwise excellent applications whose English language proficiency scores are close to the minimum requirement will be admitted to the PMD. These candidates will be reconsidered for admission to the MBA upon successful completion of the PMD, and completion of the GMAT score.

International Students who are applying to other MBA Programs in Canada may also enroll. Ryerson will not guarantee that the completion of the Diploma will result in stronger consideration from other Programs. Students should preferably be strong and effective communicators, comfortable with projects and team work.

1.3. Structure

The Professional Masters Diploma in *Skills for Success for International Students joining Canadian MBA Programs* will consist of four courses in total, all of which are required. In addition, a practical report or case study based upon the student's work experience will be required to complete the Diploma.
The curriculum is structured as follows.

1. Case Analysis and Presentation
2. Effective Writing for Business Administration
3. Canadian Business History
4. MB 8005 Principles of Management (existing MBA foundation term course required for students without an undergraduate business degree)
5. Capstone Project

Diploma graduates will complete the program requirements in one academic semester; all four courses and the capstone must be completed during the term immediately prior to beginning the MBA Program at Ryerson. (This may be different for students enrolled in the *Skills for Success* Diploma who intend to pursue an MBA at another institution.)

The successful completion of all requirements, with a cumulative grade point average of 3.00 or higher, is required for the diploma to be awarded. Participants must also complete and submit an Application to Graduate with a Diploma Form prior to the appropriate deadlines (see the information on Registration and Graduation from Diploma Programs at www.ryerson.ca/graduate and www.ryerson.ca/ce.)

1.4. Program Content

The curriculum for this Diploma draws upon research of strategies that lead to the successful integration of International Students into Canadian MBA Programs, as well as the experience of administrators and professors within both the Yeates Graduate School and the MBA Program at Ryerson University. Appendix 2 shows a comparison of the different Pre-MBA programs available for international students. Course content will directly address the challenges of adjusting to the Canadian academic, cultural, and social environment, three key areas that will help to determine their success.

The Program will focus on the following areas of study:

- Business Ethics
- Canada's Legal and Political systems
- Presentation Skills
- Case Study analysis
- Foundations of Canadian Business Culture
- An introduction to the Leading Industries and Corporations in Canada

1. Case Analysis and Presentation – Course #1

Case analysis forms the backbone of most MBA Programs, as it enables students to gain access to the thinking of practicing managers, and competitive dynamics. It requires a very different skill set from those developed in education systems oriented towards exams, in that it requires reasoned discussion, collaboration, and effective argumentation. This course will focus on how to effectively collaborate to design solutions to case problems, and to present them orally and in teams. Many MBA programs require students to solve cases and to conduct research on corporations to address emergent issues. Students will gain expertise in accessing relevant materials about Canadian corporations through annual reports, Bloomberg terminals, and other publicly available materials, in order to effectively reason from a set of fact presented towards a solution to problems framed by the case. They will learn how to effectively contribute to case discussion teams in classes where participation is part of the evaluation scheme. Presenting case results as part of a team using slide decks to convey the situation and proposed solutions will also play a major role in the class, which will be focused on experiential learning.

Course Objectives and/or Learning Outcomes
Effective Oral Presentation skills Problem Formulation, reasoning from facts towards a conclusion Comprehension of written case materials Research into contemporary problems using publicly available data Contributing to Case Teams Written analysis of business cases Providing Feedback to Peers about performance

2. Effective Writing for Business Administration - Course #2

Case analysis forms the backbone of most MBA Programs, as it enables students to gain access to the thinking of practicing managers, and competitive dynamics. This course builds on course #1 to provide a foundation in the types of analysis and written communication expected in the classroom and the workplace, bridging the gap between proficiency in English and effective written business communication. Students will learn how to structure arguments that will be advanced over the course of a paper. Written communication of cases will be covered, along with an introduction to simple models of rhetoric that will enable students to identify key claims needed to present effective solutions to problems and issues presented as part of case analysis and other types of writing. It

also covers other types of writing, including how to write effective email correspondence, short written answers to problems, and how to structure paragraphs and essays. It also covers how to take information obtained through research and use it effectively to support recommendations and conclusions. It can be taken concurrently or following course #1. It will also cover academic integrity topics, including how to avoid plagiarism, how to correctly paraphrase referenced material, and how to build academic integrity in written work.

Course Objectives and/or Learning Outcomes

Effective rhetorical structures for written case analysis
Understanding Academic Integrity
Obtaining and using information acquired in research
Norms for written business communication
Identifying problems with written communication

3. **Canadian Business History – Course #3**

This course is designed to acquaint students with the unique features of Canadian business as it developed over time, and to understand the relationship between Canada's economy and key trading regions, including the United States, the Commonwealth, Europe and developing economies. The structure and role of government and politics, the relationships with indigenous peoples, and the differences between the regions of Canada will be covered. The relationship between political movements and businesses, along with a historical perspective on the development of key industries will be covered, including a focus on the extraction sectors, on the developments in capital markets, including the role of provincial legislation, and other important aspects of the Canadian business and economic environment since the colonial era. Students will be asked to research pivotal moments in Canadian business history, and the relationship between the public and private sectors in Canada, and the impact of immigration on the Canadian economy.

Course Objectives and/or Learning Outcomes

Gain an understanding of the basic history of Canada, from European settlement to the present.

4. MB 8005 Principles of Management - Course #4

Course Objectives and/or Learning Outcomes

This survey course introduces students to foundational ideas regarding management, organizations, business, firms and their operational contexts. The course comprises a tour through the non-financial management functions. It begins with an outline of the history of management thought, an approach that frames the successive topics. It is followed by a unit on business law and corporate governance, which explains the roles and responsibilities of managers and executives. The organizational behaviour/human resource section highlights principles of social psychology as they relate to how people interact in organizations, and small groups. The section on operations and management information systems shows how organizations use technologies. The marketing module introduces the first principles of this function. There are also sections introducing the unique aspects of entrepreneurship and small business, as well as non-corporate management.

- To inform participants about the key facets of management.
- To provide exposure to the skills required by managers.
- To provide practical application and examples of these skills through skill-development activities similar to those undertaken by managers in industry.
- To explore how managers measure performance and analyze and interpret information.
- To explore management frameworks and theories in a variety of industries and contexts.
- To develop problem recognition and decision-making skills in a managerial context.
- To familiarize participants with the process of strategic business case analysis for the purpose of identifying, analyzing and evaluating business opportunities.

1.5. Modes of Delivery

The four classes will be delivered face to face in the classroom. The courses will focus on experiential learning, similar to the existing teaching methods in the MBA Programs, and will include short lectures, discussion of written business cases, and discussion exercises in the classroom. They will consist of a mix of lectures, open seminars, videos, in-class discussions, and group collaboration. Active participation is essential, in that the classes will include short lectures and writing exercises in the classroom. Emphasis will be placed on enabling students to work in the classroom on exercises created to ensure that students have multiple opportunities to build key skills, and improve on them over the course of the term. It will also provide students with a better understanding of the expectations of instructors and fellow students educated in North American business schools, which will improve international student's ability to contribute effectively. Peer ratings will form part of the feedback, which will be immediate and extensive. Multiple opportunities to solve cases, increasing in complexity over the term, and multiple requirements to present the results of case analysis through public speaking will enable students to build skills through repetition over he course of the term.

The capstone project will be completed through small group meetings with the instructor and other students, so that regular progress of the period of the term can be monitored, and so that students can share experiences. Although not as extensive as the three credit Major Research Paper in the Ryerson MBA Programs, this course will enable the students to build the skills necessary to complete an individual written project.

1.6. Assessments of Teaching and Learning

The PMD directly addresses Ryerson's mission:

"The special mission of Ryerson University is the advancement of applied knowledge and research to address societal need, and the provision of programs of study that provide a balance between theory and application and that prepare students for careers in professional and quasi-professional fields.

As a leading centre for applied education, Ryerson is recognized for the excellence of its teaching, the relevance of its curriculum, the success of its students in achieving their academic and career objectives, the quality of its scholarship, research and creative activity and its commitment to accessibility, lifelong learning, and involvement in the broader community."

It's content is balanced between knowledge, theory and skills, and aims to increase the chances of success for graduates, upon completion, and admittance to MBA Programs, which will improve graduates chances of both success in the program and subsequently of successfully entering a variety of professional fields related to the MBA. It will also contribute to the mission of graduate education at Ryerson to "Enable greater student engagement and success through exceptional experiences" as expressed in the 2014-2018 Academic Plan "Our Time To Lead." The PMD also directly addresses the following strategies for graduate education in that plan:

- Attract top graduate students by developing a strategic approach to domestic and international recruitment, and fostering excellence in graduate student supervision.
- International students who are better prepared for the MBA classroom, with communication skills, research skills, and knowledge of the Canadian business environment are likely to do better in the program, and subsequently in the post-MBA labour market. By demonstrating concern for international student achievement, the PMD will improve Ryerson's ability to attract highly qualified international students.
- It will also better prepare them for the Major Research Paper, which is a requirement of the MBA Programs, with the completion of the individual capstone project in the PMD.

- Better prepared international students will also improve the classroom environment for domestic students, and enable a higher level of discourse in the MBA classroom, as well as improve the quality of work in the MBA Programs' many collaborative group assignments.
- Strengthen graduate education by introducing a new funding allocation mechanism, identifying ways to improve the administration and delivery of graduate education, and implementing policies that support program quality and timely program completion.
- Improving international students' experience in the Ryerson MBA Programs is the central role of the program, and directly addresses the issues of quality and completion of the MBA Programs.
- Continue master's and doctoral program development subject to appropriate government funding.
- This program is cost recovery, which is a new funding mechanism for the MBA program.

For individual courses in the diploma, each of the course assessments reports (midterm and final examinations, projects and research papers) has been identified and cross-referenced with graduate level expectations which will be used by faculty as the rubrics that comprise the marking scheme. These course assessments together with the deployment of the course-specific GDLEs when grading student learning and assessments ensure that learners have achieved the Program Learning Outcomes. The TRSM Grad council, in considering, among other inputs, teaching evaluations submitted by the Graduate Program Director and learners, will decide annually whether it is necessary to augment the diploma's course content for currency with respect to professional changes and allied best practices.

The Program Learning Outcomes Chart and the Professional Master's Diploma Level Expectations (GDLEs) Chart below cross reference and illustrate the mapping of individual courses to the Diploma Program's Learning Outcomes, Methods and Assessment; and the charting of which individual Program Learning Outcomes address the enumerated, standard Professional Master's Diploma Level Expectations

1. Depth and Breadth of Knowledge	A systematic understanding of knowledge, 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.	Courses 3 and 4 develop awareness of current problems and insights, by providing an introduction to management theory (4) and awareness of how current problems are linked to Canadian business history (3).

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; 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.	Courses 3 and 4 provide a graduate level introduction to the discipline of management, addressing conceptual understanding and methodological competence, while the capstone project exposes the students to research related to the Canadian business context, another aspect of this degree expectation. In particular Course 4 provides an introduction to management theory and scholarship addressing point “c”. The capstone project, along with case studies and exams addresses the need for written argument and original application of knowledge.
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.	The capstone project is designed to develop and strengthen research skills and encourages them to look at new questions, in the Canadian setting, while course 3 provides an introduction to the Canadian business context, which is a new setting for these students.
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; and b. The intellectual independence required for continuing professional development; c. The ethical behaviour 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.	Courses 1 and 2 address the skills needed to be successful both in the MBA classroom, and in professional settings by developing written and oral communication skills. Course 4 in particular addresses ethical decision making, while academic integrity is stressed throughout the four courses. The Canadian context is a new and particular context for these students, and better understanding of it should improve students professional capacity and autonomy.

5. Level of Communication Skills	The ability to communicate ideas, issues and conclusions clearly.	Courses 1 and 2 directly address these points.
6. Awareness of Limits of Knowledge	Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.	The individual capstone project will provide students with the opportunity to experience complexity and limitations in the application of management to specific areas of research.

The PMD will be governed by the TRSM Graduate Program Council, in particular the curriculum committee. Attracting high quality international students to the MBA Programs is a key concern, and will be regularly monitored by the Curriculum Committee and the Admissions Committee.

1.7. Resources

a) *Adequacy of utilization of existing human, physical and financial resources*

As will be detailed below, Ryerson University commits the Deans, select faculty, and administrative teams of the Yeates School of Graduate Studies, the Faculty of the Ted Rogers School of Management and its centralized university-wide services to support the delivery of this diploma program. Physical Space will be provided within the Ted Rogers School of Management, by utilizing the dedicated classrooms for the MBA Programs, along with cubicles with personal storage spaces for students, a kitchen room, and an the MBA workroom. These dedicated spaces are accessible only to PMD, MBA, and MScM students and staff.

b) Faculty Collaboration

This proposed diploma is a collaborative effort between Ryerson MBA Programs and the Yeates School of Graduate Studies, supported by theTed Rogers School of Management Graduate Program Council.

c) Faculty Resources

Qualified instructors will be engaged to present curricular material. These may include faculty members, adjunct faculty members and others, as appropriate. Faculty members have been identified with the academic background and expertise to be able to provide the necessary instruction, guidance and leadership to make the proposed program a success. To demonstrate their quality, their curriculum vitae are found in Appendix 3.

d) Library Support

Collections
The Ryerson Library hosts over 600,000 monographs in electronic, print, audio and video form, subscribes to well over 56,000 online journal subscriptions and provides access to over 200 online databases that contain full text articles, abstracts, images, historical documents, global news sources and datasets. All told, the acquisitions budget totals over $4.4 million dollars.

The collection development philosophy is very much holistic in its intent. In response to the rise of interdisciplinary studies in the academy, the Library has ensured that librarians engage in collection development not motivated by strict subject silos, rather by the needs of all program areas. Collection decisions are made to improve resources for all users. Making new acquisitions available is the priority, and there is less concern about which subject area should pay for it. This has made the Library nimble in identifying areas in need of strengthening and lessening the bureaucracy involved in making collection decisions. All efforts are made to fulfil requests of faculty and students, within reason.

Similarly, a committee comprised of librarians representing all subject areas gets requests for new serials and electronic resources. The committee considers all requests and approvals are granted based on a myriad of factors, including usability, cost, access, and relevance to programs of study at Ryerson.

Where at all possible, the Library works with national and provincial consortiums, the Canadian Research Knowledge Network (CRKN) and the Ontario Council of University Libraries (OCUL) to negotiate licenses for electronic resources. This increases purchasing power, and allows for assurance that the content purchased is archived in perpetuity on servers housed at University of Toronto via the Scholarsportal initiative.

Interlibrary Loans

The Interlibrary Loan (ILL) service allows users to borrow items and obtain articles from other libraries through our ILL staff, if materials are not owned by the Ryerson University Library. This service is provided free of charge.

In Person Services

The Ryerson Library is aware of the needs of students of The Yeates School, and has created a service model to respond to those needs. A librarian is available for consultation at the reference desk on evenings and weekends throughout the academic year, and the Borrowing and Lending Services team is dedicated to providing ready access to the resources at the library.

Online Services

The library provides access to online chat reference support via a province wide initiative called AskON. Librarians are available to chat with students to help them through the research process. AskON is open during evenings and weekends. Alternately, students can submit reference questions via email with a 24-hour turnaround time for response.

E-reserve services are available via Blackboard to provide access to course materials on a 24/7 basis.

Drop-in Workshops

The Library provides a variety of drop-in workshops for students wishing to learn more about resources and services. These include sessions on mastering searching our electronic resources. These workshops are offered at varying times of the term, but there are a variety of time slots available that are convenient to students.

e) IT Resources

The Communications and Computing Services (CCS) Unit of Ryerson University will provide all the necessary information technology required of the program, the faculty and the diploma graduates.

f) Laboratory Infrastructure

PMD students will have access to the Bloomberg Terminals, which provide high quality, real time financial data and company reports unavailable elsewhere. These terminals are located in the Ted Rogers School of Management building, and are accessible by graduate students and students in the School of Accounting and Finance.

1.8. Resources for Graduate Program Only

This Professional Master's Diploma is a cost recovery program and its students will be eligible to access the University's institutional bursary program.

[Provide evidence[ii] that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation and foster an appropriate intellectual climate.

The capstone project will be administered as a course, and taught by a research qualified member of the Yeates School of Graduate Studies from the Graduate Programs in the Ted Rogers School of Management.

1.9. Resources for Undergraduate Program Only

Not applicable

1.10. Quality and Other Indicators

[Define and provide indicators that provide evidence[2] of quality of the faculty (e.g., qualifications, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program).

Provide evidence of a program structure and faculty research that will ensure the intellectual quality of the student experience.]

1.11 Fields

Not applicable

APPENDIX 1:
Statistics for International Students
From Ryerson's University Planning Office Website

		13/14			12/13			11/12			10/11			09/10		
		Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio
Full-Time	MBA	70	18	25.7%	61	14	23.0%	121	11	9.1%	105	14	13.3%	47	8	17.0%
	MTI	18	2	11.1%	22	2	9.1%	60	6	10.0%	66	7	10.6%	20	4	20.0%
	MMSc	3	1	33.3%	10	6	60.0%	8	2	25.0%	8	0	0.0%	2	0	0.0%
	Total	**91**	**21**	**23.1%**	**93**	**22**	**23.7%**	**189**	**19**	**10.1%**	**179**	**21**	**11.7%**	**69**	**12**	**17.4%**
Part-Time	MBA	81	1	1.2%	71	0	0.0%	17	0	0.0%	7	0	0.0%	54	1	1.9%
	MTI	50	0	0.0%	50	0	0.0%	15	0	0.0%	14	0	0.0%	53	0	0.0%
	MMSc	1	0	0.0%	4	0	0.0%	3	0	0.0%	1	0	0.0%	6	0	0.0%
	Total	**132**	**1**	**1.2%**	**125**	**0**	**0.0%**	**35**	**0**	**0.0%**	**22**	**0**	**0.0%**	**113**	**1**	**0.9%**

	13/14			12/13			11/12			10/11			09/10		
	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio	Total Students	Int. Students	Ratio
Cumulative	**223**	**22**	**9.9%**	**218**	**22**	**10.1%**	**224**	**19**	**10.1%**	**201**	**21**	**10.4%**	**182**	**13**	**7.1%**

year over year growth: 21.5%

All data from Ryerson's Univesity Planning Office Website:
http://www.ryerson.ca/upo/statistics/grads-2013.html
http://www.ryerson.ca/upo/statistics/grads-2012.html
http://www.ryerson.ca/upo/statistics/grads-2011.html
http://www.ryerson.ca/upo/statistics/grads-2010.html
http://www.ryerson.ca/upo/statistics/grads-2009.html

APPENDIX 2:

Comparison of other Pre-MBA Programs for International Students available in Canada

School	international student	weeks	semesters	no of courses	hrs/wk, days/wk	tuition	residence	meal plan	homestay	cost of materials
Brock University St.Catharines, Ont. (Goodman)	7	28	F & W	n/a	n/a	$ 14,316	$10,000	incl	n/a	$ 1,200
McMaster University, Hamilton, Ont. (DeGroote)	13	2	S	n/a	30 / 5	$ 1,300	n/a	incl	n/a	incl
Queen's University Kingston, Ont.	37	8	F	n/a	21 / 5	$ 5,098	$ 3,548	$2,163	n/a	$ 140
University of New Brunswick Saint John, N.B.	67	28	F&W / W&S	11	n/a	$ 15,997	$ 7,649	$2,600	n/a	n/a
Wilfrid Laurier University, Waterloo, Ont./Toronto	20	28	F & W	n/a	20 / 5	$ 10,816	$ 5,000	$4,000	n/a	$ 400
↘ Laurier Summer Program	*	16	S	n/a	20 / 5	$ 7,738	n/a	n/a	n/a	$ 400
York University, Toronto, Ont. (Schulich)	58	8	S, F	n/a	20 / 5	$ 3,950	$ 2,330	$1,680	$1,760	incl

School	social / cultural events	certificate / diploma	pre-admited / optional (o),	IELTS	YELT	TOEFL: min score for paper, computer, or iBT	notes
Brock University St.Catharines, Ont. (Goodman)	Y	Y	c				
McMaster University, Hamilton, Ont. (DeGroote)	Y	N	o				
Queen's University Kingston, Ont.	n/a	N	o				taught by English department
University of New Brunswick Saint John, N.B.	Y	N	o	6.0			
Wilfrid Laurier University, Waterloo, Ont./Toronto	Y	N	c	6.0		78 (iBT)	
↘ Laurier Summer Program	N	N	c	6.0		78 (iBT)	
York University, Toronto, Ont. (Schulich)	Y	Y	o	6.5	5	560, 220, or 83-87	taught by English Language Institute
							IELTS = International English Language Testing System
							YELT = York English Language Test

Proposal for a Professional Master's Diploma in Accounting

Note: Format to be Changed for Quality Council

1.0 Introduction

The Ted Rogers School of Management (TRSM) has as its mission the delivery of a relevant, applied, and up-to-date Business curriculum that produces graduates who are ready to contribute to our Business community. The Accounting major in the Ted Rogers School of Business Management has always been an attractive major graduating approximately 250 to 300 students per year. To be able to progress in the field of accounting, the student had to obtain a professional designation. The three professional bodies in Canada were Chartered Accountant (CA), Certified General Accountant (CGA) and Certified Management Accountant (CMA). Each of these bodies had their own education and experience requirements to enter their profession.

To ensure that the Accounting program stayed attractive to potential students, the Accounting department has always maintained and updated all of the courses required for students to be able to go on and challenge professional exams in one of three accounting designations.

In 2013-2014 in order to meet the pressures of a rapidly evolving environment and resulting opportunities and risks facing the Canadian accounting profession, the three major accounting bodies in Canada voted to merge into one accounting body – Chartered Professional Accountant (CPA). Along with the merger and change in designation came changes to the education requirements as far as the universities in Ontario are concerned. Instead of the education requirements (the 51 credit hours) that all fit in an undergraduate program, the universities are being asked to align with the western provinces and offer the education requirements in a graduate program.

Our proposal is a response to the changes that the profession has determined is necessary in the education of professional accountants in the wake of the mergers.

1.1 Post-degree Diploma

Prior to 2014, accounting students were able to acquire all of the courses mandated by the professional bodies in an undergraduate program. In Ontario, once they received their degree, they were required to get work experience as well as write the professional exams. If the student ensured that they took all the courses in their undergraduate degree, no further course work was required. Under the new CPA requirements, this has changed.

The CPA certification program consists of:

- academic prerequisites for admission to the CPA Professional Education Program (PEP),
- a graduate level CPA PEP,
- nationally set examinations, including a Common Final Examination, and
- qualifying practical experience.

The academic prerequisites for admission to the CPA Professional Education Program (PEP) are courses taken in a commerce undergraduate degree program. The Professional Master's Diploma program that we are proposing is meant to cover a portion of the second bullet point, the graduate level CPA PEP.

1.2 Goals of the program

Given the changes in the educational requirements we want to offer the post degree courses required by the Accounting professional body. In order to understand where this program fits in, we have provided a visual depiction of the path to an Accounting professional designation (from the www.cpaone.com website).

The Accounting major in the School of Accounting and Finance provides the undergraduate course requirements as shown in the blue box above labelled Academic Prerequisites. Students would then be required to pick up courses to satisfy the Professional Education Program either through a university or from the professional body. The Institute requires that the courses offered in the PEP must be offered at a post-degree level. They will allow the Core 1 &2 courses as well as the Elective 1 & 2 courses to be offered in a post-degree diploma while the Capstone 1 & 2 must be offered at a Masters level.

We are proposing to provide a Professional Masters Diploma that will cover the Core and Elective components so that the students will be exempt from having to take these courses after the end of their undergraduate studies. The program will be offered in the Spring/Summer semester following their last semester in the undergraduate program. Students will then only be required to take the Capstone 1 & 2 following graduation.

1.3 Graduate Student Profile

It is anticipated that students graduating with a BComm from the School of Accounting and Finance will take advantage of the program in order to complete as many of their educational requirements as possible prior to entering the workforce. Graduates from other universities with a bachelors degree in accounting, which would generally be a Business Commerce Degree or a Bachelors of Business Administration would also qualify for the PMD.

2.0 Admission Requirements

The students entering the program will be graduates of the School of Business Management with an Accounting major with a 3.33 or B average in the undergraduate program.

3.0 Curriculum

As required by CPA Canada, the program will consist of 4 core courses and 1 capstone course.

3.1 Courses

GRAD Advanced Auditing
GRAD Advanced Financial Accounting
GRAD Financial Statement Analysis and Valuations – new course
GRAD Information Systems Control, Management and Audit – altered course
GRAD Accounting Integration and Analysis (Capstone Course) – new course

The descriptions for the courses are still being drafted by faculty.

3.2 Competition

Table of Comparable Programs in Ontario as well as Masters Programs
(from www.cpaone.com website)

Universities	Programs (Effective for students starting after date)	Students/Candidates successfully completing the program are exempt from:					
Ontario							
		Core 1	Core 2	Elect.1	Elect2	Cap.1	Cap.2
Queen's University	BComm – CPA Stream + Graduate Diploma in Accounting Program (May 2014)	♦	♦	♦	♦		
Brock University	BAcc + Graduate Diploma in Accounting Program (January 2015)	♦	♦	♦	♦		
	BAcc + MAcc (January 2015)	♦	♦	♦	♦	♦	♦
	MBA – CPA Stream (September 2014)	♦	♦				
McMaster University	BComm – CPA Stream + Graduate Diploma in Accounting Program (May 2014)	♦	♦	♦	♦		
	MBA – CPA Stream + Graduate Diploma in Accounting Program (May 2014)	♦	♦	♦	♦		
Wilfrid Laurier University	BBA – CPA Stream + Graduate Diploma in Accounting *(May 2014)	♦	♦	♦	♦		
	BA Econ – CPA Stream + Graduate Diploma in Accounting* (May 2014)	♦	♦	♦	♦		
	BBA double degree – CPA Stream + Graduate Diploma in Accounting* (May 2014)	♦	♦	♦	♦		

		Core 1	Core 2	Elect.1	Elect2	Cap.1	Cap.2
University of Waterloo	BAFM – CPA Stream + MAcc (January 2015)	♦	♦	♦	♦	♦	♦
	BScience – CPA Stream + MAcc (January 2015)	♦	♦	♦	♦	♦	♦
	BMath – CPA Stream + MAcc (January 2015)	♦	♦	♦	♦	♦	♦
	BAFM – CPA Stream + Graduate Diploma in Accounting Program (January 2015)	♦	♦	♦	♦		
	BScience – CPA Stream + Graduate Diploma in Accounting Program (January 2015)	♦	♦	♦	♦		
	BMath – CPA Stream + Graduate Diploma in Accounting Program (January 2015)	♦	♦	♦	♦		
York University, Schulich School of Business	MBA – CPA Stream (September 2015) **	♦	♦	♦	♦		
	BBA – CPA Stream or iBBA – CPA Stream + MAcc (term 3) (September 2015) **	♦	♦	♦	♦		
	MAcc (September 2015)**	♦	♦	♦	♦	♦	♦
	MBA – CPA Stream + MAcc (term 4) (January 2016) **	♦	♦	♦	♦	♦	♦
	BBA – CPA Stream or iBBA – CPA Stream + MAcc (terms 3 and 4y) (September 2015) **	♦	♦	♦	♦	♦	♦

Proposed Professional Masters Diploma in Financial Analysis

The Professional Masters Degree (PMD) in Financial Analysis is being developed to provide a graduate level program funding and investing in organizations. Participants in the financial services sector will benefit from this program, which will lead to lucrative employment in a variety of lucrative positions, from financial advisor, financial analyst, portfolio manager, and risk manager.

1.1 Introduction to the Diploma

This program is designed to provide graduate level instruction and credits to students who plan to enroll or are currently enrolled in the Chartered Financial Analyst (CFA) program. The CFA is a self-study program with three levels, each culminating in a six hour exam, and as such, has a much higher attrition rate than MBA Programs. Students who enroll in the PMD are expected to have a significantly higher success rate than those who study on their own.

This proposed PMD will deliver a set of instructor-led graduate courses that will complement the CFA program and provide a peer-cohort in preparing for the CFA exams.

This program prepares graduates to successfully apply for and complete the (CFA exams. To earn the CFA one must demonstrate mastery of the skills needed for investment analysis and decision making for the global financial industry. A candidate for the CFA must have four years of qualifying investment work experience. The Program is organized into three levels, each culminating in a six-hour exam. This PMD will prepare an individual to write all three exams. These requirements are similar to those for applicants to Ryerson's two MBA Programs.

This diploma directly addresses Ryerson's mission:
"The special mission of Ryerson University is the advancement of applied knowledge and research to address societal need, and the provision of programs of study that provide a balance between theory and application and that prepare students for careers in professional and quasi-professional fields".

Ryerson Masters of Business Administration (MBA) Programs, consisting of the MBA and the MBA in the Management of Technology and Innovation, are known for a focus on ethics and sustainability, and provide graduate level management education that is affordable, while providing an excellent return on investment. This program prepares students for careers within the finance sector through a curriculum that is both based in theory and directly relevant to industry, and therefore represents both the 'intersection of mind and action.' Students may find the program useful in accelerating employer recognition of competencies developed abroad, and to prepare them for working in the Canadian and US business environment, so it may act as a bridging program for foreign trained professionals.

The curriculum consists of five graduate courses in Finance, which are as follows:

1. Fixed income Securities
2. Advanced Portfolio Management
3. Advanced Investment Management
4. International Finance
5. Derivatives

Additional courses may be added to the curriculum, specifically to prepare students to write the three Chartered Financial Analyst (CFA) exams. These courses are taught at a graduate level with the expectation that the students have an understanding of finance concepts from their completion of a post-secondary business program with a major in finance and from their industry experience.

1.2 Admission Requirements

Applicants should have an undergraduate degree in business or commerce (BBA, or B Comm.) and industry experience in financial planning and management. Candidates who already have an MBA or equivalent graduate degree (e.g. MA Economics, MMSc, etc.) may be accepted if the PMD Curriculum does not overlap with their graduate degree credits.

Applicants must demonstrate capability with financial mathematics (e.g. concepts such as NPV, IRR, ROI, DCF, etc.). Applicants must also demonstrate familiarity with global financial markets.

These admission requirements are consistent with the requirements for admission to the Ryerson MBA Programs:

- Completion of a four-year Bachelor of Arts degree from a recognized university.
- A minimum B (73% or above) average in the last 2 years of university study (including post graduate university programs).
- An English language proficiency score for applicants who have degrees from institutions in which English is not the language of instruction or examination. The minimum score requirement for the Ryerson MBA program is: TOEFL: 100, IELTS: 7.5, MELAB: 90, PTE 68, which will also be the requirement for the PMD.
- Minimum of two years full-time post-graduate work experience.

For evaluation of foreign academic credentials if the applicant does not have the undergraduate degree requirement, applicants must submit their application complete with translated and notarized copies of all their academic transcripts and credentials.

1.3 Curriculum Structure[1]

This program will consist of five courses, as noted above. The courses may be taken in any order. Students will take the courses on a part time basis, taking one or two courses per term. The minimum completion time is one calendar year, or three semesters.

Table 1
Course Descriptions

Course Name	Course Description
Fixed income Securities	This specialized course in fixed income securities will start by reviewing fixed income markets, discount factors, pricing, yield, duration, convexity, and the term structure of interest rates. The second part of the course looks at the use of binomial trees and the Monte-Carlo methodology in the pricing and hedging of a variety of fixed income securities and their derivatives.
Advanced Portfolio Management	Portfolio management requires an integration of skills in financial statement analysis, economic analysis, quantitative analysis, taxation and the valuation of equity and fixed income securities. Topics include the interrelation of economic and market conditions, security valuation techniques, the specific requirements of individual and institutional investors, development of suitable investment policies, construction of multi-asset portfolios that meet the investors' requirements and circumstances, implementation of the plan, monitoring the profile, responding to change, and the measurement and evaluation of performance.
Advanced Investment Management	This course enhances and extends the understanding of the basic investment and option theory. It provides a rigorous theoretical background and introduces the analytic tools necessary for sound decision making in a financial trading environment, stretching from investor behavior to hedging strategies and noise trading using individual securities including stocks, fixed income securities, commodities, currencies, and futures and options.

[1] Equivalent to section 1.3 of the proposal submission template of the Ontario Universities Council on Quality Assurance.

Derivatives	This course is entirely dedicated to studying derivative securities-forward and futures contracts and how they modify the risk characteristics of a portfolio, how the exchange, clearing house and marketing to market systems work, arbitrage pricing, relationships, interest rate and currency swaps and the use of various types of options contracts and their use for hedging risk.
International Finance	The overriding theme will be the exposure of multinational corporations and investors to the risk of varying exchange rates. Topics include: international financial markets (i.e., euro currency, bond and equity markets), various parity relationships, forecasting exchange rates, managing exposure to changing exchange rates, multinational capital budgeting and multi-national cost of capital.

The table below describes how the above curriculum will meet the Graduate Degree Level Expectations (GDLEs).

1. Depth and Breadth of Knowledge	A systematic understanding of knowledge, 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.	Each of the four courses addresses the limitations of current systems, and provides a systematic understanding of knowledge in the topic areas.

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; 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.	This Professional Master's Diploma is a course-based program, offered at the graduate level, in a manner consistent with MBA pedagogy, including case studies that enable students to evaluate the financial techniques in practice. Students must master the financial techniques as outlined above, but they must also be aware of the complexities associate with their application in practice, which will be achieved through classroom discussion, assignments, and examinations.
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.	This competence will be evaluated primarily through projects and examinations within the courses.

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; and b. The intellectual independence required for continuing professional development; c. The ethical behaviour 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.	As with most MBA level finance courses, the material is closely aligned to the practices used in the areas of fixed income securities, portfolio management, investment management, derivatives, and international finance. Issues of complex decision making and ethical behaviour are central to the application of the financial models across the five courses.
5. Level of Communication Skills	The ability to communicate ideas, issues and conclusions clearly.	The communication of ideas in this course will come from classroom assignments, examinations, and projects, which will include a written component and presentations.
6. Awareness of Limits of Knowledge	Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.	The field of finance has been rapidly evolving since the Global Financial Crisis, and although this material will be presented at a master's level, the limitations of the models in practice will be covered as part of discussions of professional practice.

1.4 Program Content

The courses will be taught by faculty members from the Ted Rogers School of Management (TRSM), and qualified industry practitioners. The program will be delivered in evening sessions, and courses will be cross-listed as electives within the MBA curriculum, recognizing that the class will be a combination of both part-time PMD students and MBA students (part-time and regular).

There are several other university-level, finance-oriented graduate degrees within the Greater Toronto Area that would also be useful for students pursuing a graduate education in finance, including the Master of Finance programs at University of Toronto, and York University, which contain tracks oriented towards the CFA, but at a significantly higher level of tuition. The John Molson CFA MBA program, offered by Concordia University in Toronto, provides similar material in its finance-oriented courses, but requires that students also take the MBA component of the degree, making the cost per course similar, but the degree much more expensive.

The proposed PMD enjoys the support of the Ryerson resources, discussed below, and the presence of engaged faculty members from TRSM and the MBA Programs. It is focused on preparing specifically for the CFA exam, and can be taken without the additional MBA courses, which include significant components from the other disciplines within management. There are also non-university preparatory courses oriented around the CFA. However, the quality of university-level courses, and the resources within the university distinguish the PMD from these non-university offerings.

The PMD will be governed by the TRSM Graduate Program Council, in particular the curriculum committee. Attracting high quality graduate students to the MBA Programs is a key concern, and will be regularly monitored by the Curriculum Committee and the Admissions Committee.

1.5 Mode of Delivery[2]

The courses are planned for classroom delivery, in a manner consistent with MBA pedagogy. This includes an active learning environment that includes case studies, instruction in the financial instruments, lectures, guest speakers from industry and student presentations.

1.6 Assessment of Teaching and Learning

For individual courses in the diploma, each of the course assessments reports (midterm and final examinations, projects and research papers) has been identified and cross-referenced with graduate level expectations which will be used by faculty as the rubrics that comprise the marking scheme. These course assessments together with the deployment of the course-specific GDLEs when grading student learning and assessments ensure that learners have achieved the Program Learning Outcomes. The TRSM Grad Program Council, in considering, among other inputs, teaching evaluations submitted by the Graduate Program Director and

[2] Equivalent to section 1.5 of the proposal submission template of the Ontario Universities Council on Quality Assurance.

learners, will decide annually whether it is necessary to augment the diploma's course content for currency with respect to professional changes and allied best practices.

1.7 Resources

a) Adequacy of utilization of existing human, physical and financial resources

As will be detailed below, Ryerson University commits the Deans, select faculty, and administrative teams of the Yeates School of Graduate Studies, the Faculty of the Ted Rogers School of Management and its centralized university-wide services to support the delivery of this diploma program.

Physical Space will be provided within the Ted Rogers School of Management, by utilizing the dedicated classrooms for the MBA Programs, along with cubicles with personal storage spaces for students, a kitchen room, and an the MBA workroom. These dedicated spaces are accessible only to PMD, MBA, and MScM students and staff.

b) Faculty Collaboration

This proposed diploma is a collaborative effort between Ryerson MBA Programs and the Yeates School of Graduate Studies, supported by the Ted Rogers School of Management Graduate Program Council.

c) Faculty Resources

Qualified instructors will be engaged to present curricular material. These may include faculty members, adjunct faculty members and others, as appropriate. Faculty members have been identified with the academic background and expertise to be able to provide the necessary instruction, guidance and leadership to make the proposed program a success. To demonstrate their quality, their curriculum vitae are found in Appendix D.

Ryerson Faculty members are listed in the table below. The program also enjoys the support of additional members of the School of Accounting and Finance within TRSM who are also members of the Yeates School of Graduate Studies, and whose CVs are included in the Appendix.

Table 2 Faculty

Faculty Member	Home Unit & Rank
Scott Anderson	SAF, Finance, Associate Professor
Feng, Yi	SAF, Finance, Assistant Professor

Allen Goss	SAF, Finance, Associate Professor
Li, Yuanshun	SAF, Finance, Associate Professor
McGraw, Patricia	SAF, Finance, Associate Professor
Rakhmayil, Sergiy	SAF, Finance, Associate Professor
Ayse Yuce	Finance Department, SAF, TRSM

The MBA Program, and TRSM as a faculty have sufficient faculty who can teach the courses in this program, although we envision hiring industry experts to teach at least one of the courses.

The development of this diploma will take place between now and the 2016-17 academic year primarily by professors in TRSM, but with input from practicing professionals within the finance sector. We plan to admit an average of 25 students annually, but would be willing to admit up to 50 students.

Ryerson Library Resources

1.1.1. Collections

The Ryerson Library hosts over 600,000 monographs in electronic, print, audio and video form, subscribes to well over 56,000 online journal subscriptions and provides access to over 200 online databases that contain full text articles, abstracts, images, historical documents, global news sources and datasets. All told, the acquisitions budget totals over $4.4 million dollars.

The collection development philosophy is very much holistic in its intent. In response to the rise of interdisciplinary studies in the academy, the Library has ensured that librarians engage in collection development not motivated by strict subject silos, rather by the needs of all program areas. Collection decisions are made to improve resources for all users. Making new acquisitions available is the priority, and there is less concerned about which subject area should pay for it. This has made the Library nimble in identifying areas in need of strengthening and lessened the bureaucracy involved in making collection decisions. All efforts are made to fulfill requests of faculty and students, within reason.

Similarly, a committee comprised of librarians representing all subject areas gets requests for new serials and electronic resources. The committee considers all requests and approvals are granted based on a myriad of factors, including usability, cost, access, and relevance to programs of study at Ryerson.

Where at all possible, the Library works with national and provincial consortiums, the Canadian Research Knowledge Network (CRKN) and the Ontario Council of University Libraries (OCUL) to negotiate licenses for electronic resources. This increases purchasing power, and allows for assurance that the content purchased is archived in perpetuity on servers housed at University of Toronto via the Scholars portal initiative.

1.1.2. Interlibrary Loans

The Interlibrary Loan (ILL) service allows users to borrow items and obtain articles from other libraries through our ILL staff, if materials are not owned by the Ryerson University Library. This service is provided free of charge.

1.1.3. In Person Services

The Ryerson Library is aware of the needs of students of graduate students, and has created a service model to respond to those needs. A librarian is available for consultation at the reference desk on evenings and weekends throughout the academic year, and the Borrowing and Lending Services team is dedicated to providing ready access to the resources at the library.

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E-reserve services are available via D2L to provide access to course materials on a 24/7 basis.

1.1.5. Drop-in Workshops

The Library provides a variety of drop-in workshops for students wishing to learn more about resources and services. These include sessions on mastering searching our electronic resources. These workshops are offered at varying times of the term, but there are always time slots available that are convenient to graduate students.

1,8 Resources for Graduate Programs

The courses have been developed in conjunction with the MBA Program Director and associated graduate faculty. This diploma program has five courses, and the faculty identified above are fully capable and qualified to teach these courses. We believe that there is sufficient capacity to deliver the program.

1.9 Resources for Undergraduate Programs

N/A

1.10 Quality and other indicators

This proposal, once approved, shall be governed by the TRSM Graduate Program Council, in particular the curriculum committee. Attracting high quality graduate students to the MBA Program is a key concern, and will be regularly monitored by the Curriculum Committee and the Admissions Committee.

The TRSM Graduate Program Council will have primary responsibility for

1. coordinating program curriculum development;
2. liaising with the relevant teaching departments for the diploma;
3. ensuring the quality, currency, and content of constituent courses;
4. assuring course staffing strategies are appropriate, including the recruitment and qualifications of diploma faculty;
5. undertaking the ongoing review of program objectives, learning outcomes, and career competencies, and

This professional master's diploma program will be governed by Ryerson's Institutional Quality Assurance policies[3] and the collaborative governance model. These policies include, among others, 110, 112, 126, 127 and 142.

3. Appendices: CVs, to be added

[3] http://www.ryerson.ca/senate/policies/IQAP-policies.pdf

Yeates SCHOOL OF GRADUATE STUDIES

RYERSON UNIVERSITY

Proposal

Professional Master's Diploma in

Finance and Social Innovation

1. Introduction

The Professional Masters Degree (PMD) in Finance for Social Innovation is being developed to address three distinct groups by providing a detailed overview of new instruments for funding and investing in organizations with a mandate to address social issues. First, the growing sector of organizations pursuing social enterprise is exploring and developing creative ways of funding activities addressing social problems outside the traditional sectors of not for profit, donations and/or government funding mechanisms. Those in the sector, or seeking to fund social enterprise outside of traditional funding mechanisms, will benefit from this PMD. Second, investors seeking to diversify their portfolios, and those interested in investing in social enterprise outside the narrow confines of charitable donations will gain broad exposure to new classes of financial products, and become acquainted with the objectives of social enterprise. Third, participants in the mainstream financial services sector will benefit from exposure to these ways of evaluating social return on investment and accompanying financial instruments. Each of these fields provides a variety of lucrative positions, from investment advising, to non profit or social enterprise manager.

This diploma directly addresses Ryerson's mission:

"The special mission of Ryerson University is the advancement of applied knowledge and research to address societal need, and the provision of programs of study that provide a balance between theory and application and that prepare students for careers in professional and quasi-professional fields".

Ryerson Masters of Business Administration (MBA) Programs, consisting of the MBA and the MBA in the Management of Technology and Innovation, are known for a focus on ethics and sustainability, along entrepreneurship, innovation, and an international perspective, making it an ideal home program for the PMD. The PMD also fits with Ryerson's mission, which includes addressing societal need, and involvement with the broader community. This program educates students about innovations in finance emerging both from outside and within the field of financial services, and represents both the 'intersection of mind and action' and sustainability in funding organizations and service providers, as well as providing opportunities for investors interested in the community. This makes it very consistent with Ryerson's focus on sustainability and city building, in the Academic Plan, ratified in 2014, Our Time to Lead.

1.1 Introduction to the Diploma

"Finance for Social Innovation" describes a growing sector outside the conventional world of financial services organizations that seek market-based solutions to fund organizations and projects seeking to address social ills. Private sector, conventional

financial services organizations, credit unions, and charitable not-for-profits, along with government funding agencies are active in this sphere, as are individual investors and larger pension and mutual funds. Because these actors bring different skills, knowledge and norms to financing social enterprise, a diploma that provides students with knowledge of new financial instruments, conventional investing, corporate governance, and assessment of enterprises engaging in activities to address social innovation. The sector represents the emergence of market-based and entrepreneurial solutions to problems.

Participants may include:

- Social Entrepreneurs
- Financial Services Professionals
- Investors with an Impact agenda

Based on the Ryerson Framework for Professional Master's Diplomas[1], the proposed diploma is Type 3—a stand-alone, direct entry program.

The program consists of four courses, plus a capstone project will will be the equivalent of one course.

- Investing for Impact,
- Corporate and Non Profit Governance,
- Alternative Approaches to Finance,
- Investing and Assessing Social Impact.

This curriculum brings the expertise of finance, and the financial services industry to members of the social enterprise community, and vice versa. Many of the instruments of impact investing and the creation of instruments to fund social enterprise began outside mainstream finance, or were adapted from existing common financial instruments. The popularity of alternative means of finance and the demands on mainstream financial institutions for products with impact make this approach relevant and necessary. Graduate Level Expectations are discussed in more detail below.

The overarching goal of the diploma is to advance knowledge and impart skills necessary for financing social innovation, and to evaluate financial instruments and assess the outcomes of social enterprise. The rapid development of alternative

[1] See: http://www.ryerson.ca/content/dam/senate/agenda/2012/20121002agenmin.pdf. Page 49.

mechanisms for financing social enterprise beyond traditional charity models or the provision of government services means there is a great need to educate professionals with an interest in social innovation in finance. The role of assessments of the impact of social finance to professionals in finance is also great, and challenges traditional means of assessing the success of projects, for example by evaluating "social return on investment." This sector represents the introduction of market logics to a sector that has, for almost 200 years, relied on traditional models of charity developed by the Victorians. Advances in social media have enabled entrepreneurs with a social agenda to reach investors directly, creating a situation in which standards for success, and for evaluating projects are unclear. Into this confusion, there are increasing questions about the role of the financial services sector on society, particularly in light of the economic stagnation in the wake of the Global Financial Crisis of 2008 and the Great Recession. Rapid developments in technology have made financial products available to vast numbers of people in the developing world, and projects in these locations are also available to individual investors and small scale philanthropists. There is a great need for a program that will marry these two perspectives, and Ryerson, TRSM, the School of Accounting and Finance (SAF) and the MBA have an opportunity to make a contribution to setting standards and advancing the conversation between actors in these sectors.

The curriculum of this program will also serve as a series of elective courses in the MBA program, through cross listing of the courses and it is hoped that students who do well in the program might consider applying to the MBA Program. MBA students have had significant involvement in social enterprise, and there is demand for this material from students in the program.

1.2 Admission Requirements

- Completion of a four-year Bachelor of Arts degree from a recognized university.
- A minimum B (73% or above) average in the last 2 years of university study (Including post graduate university programs).
- An English language proficiency score for applicants who have degrees from institutions in which English is not the language of instruction or examination. The minimum score requirement for the Ryerson MBA program is: TOEFL: 100, IELTS: 7.5, MELAB: 90, PTE 68, which will also be the requirement for the PMD.
- Minimum of two years full-time post-graduate work experience.

These admission requirements are consistent with the requirements for admission to the Ryerson MBA Programs. For evaluation of foreign academic credentials if the applicant does not

have the undergraduate degree requirement, applicants must submit their application complete with translated and notarized copies of all their academic transcripts and credentials.

Alternate requirements will include students without an undergraduate business degree with an interest in this sector, who meet all or most of the requirements for admission. These candidates will need to have completed an undergraduate bachelor's degree prior to joining the Diploma Program, and meet the work experience requirements. These students will be required to take MB 8602 Investments and Portfolio Analysis, in addition to the four PMD courses. Because the PMD will be delivered on a part time basis, only domestic students will be considered, not international students.

1.3 Curriculum Structure[2]

This program will consist of four courses, plus a capstone project, which will be the equivalent of one course. Students will take two courses in the fall and two courses in the winter, completing their capstone projects in the summer. The courses may be taken in any order. Students will take the courses on a part time basis, taking one or two courses per term. The minimum completion time is one calendar year, or three semesters, with two courses per term, plus one term for the capstone project.

Courses:

- **Corporate & Nonprofit Governance** provides a context for social enterprise within the Anglo-American sphere of capital markets-focused finance. It also provides a survey of non-profit governance mechanisms. This context is related to the development of new methods of financing social enterprise through the legal structures and actors that have brought market-oriented logics into financing and assessing the performance of social enterprise. It will acquaint students with the impact of government policy and market structure on the role of the capital markets in supporting a wide range of enterprises. This material will provide perspective on the history of Canadian capital markets, their objectives, and the actors that affect them, such as pension funds, banks, exchanges, public policy makers, and corporations themselves, many of which may have an interest in financing social enterprise. Students will gain perspective on the institutions that govern capital markets within the developed countries that make up the Anglo-American sphere of capital markets-focused finance, as well as an international survey of the conventional capital markets and how their integration creates opportunities and challenges for financing social enterprise. It will acquaint students with the impact of government policy

[2] Equivalent to section 1.3 of the proposal submission template of the Ontario Universities Council on Quality Assurance.

and market structure on the role of the capital markets in supporting a wide range of enterprises, those with social agendas.

Course Objectives

- To understand the roles of boards (profit and not-for-profit), the management team, institutional investors, journalists, exchanges, and individual shareholders in the control of publicly held corporations.
- To understand the balance of power between the management team, the board and shareholders (for corporations), and how this relationship varies over time, between countries, and regions.
- To become acquainted with the history of board governance in Canada and the watershed events in recent history that have changed the way we see and regulate corporate governance, including the role of diversity, gender, and technology, and their relationship to models of organization that use market mechanisms to finance social innovation.
- To theories of governance, including the shareholder-centric model, the stakeholder and stewardship model, and the agency model.
- To be able to assess the complex relationships between social impact investors and the traditional models of investing within the Canadian context.

- **Alternative Perspectives on Finance** will provide context on approaches to finance from the a behavioural finance perspective, as well an international survey of systems of finance outside the Anglo American sphere. Because social enterprise occurs in a variety of settings, with different systems of finance, perspectives on systems such as Islamic Finance, or State oriented finance, and the systems a variety of post-colonial, developing countries, where many social enterprises are situated.

  Course Objectives

  - Understand how a market-based approach can be leveraged to generate profits by positively impacting marginalized communities and individuals around the world.
  - Examine measurement frameworks to evaluate the financial and social returns of impact investments and new business models.
  - Follow the life-cycle of impact investments from innovation and ideation to exit.
  - Consider new financial instruments and approaches across various asset classes, including the emergence of social impact bonds.

- **Investing for Impact** is an industry-focused course on both impact investing in social enterprise as part of portfolio of investments, and on bottom of the pyramid finance such as micro-finance. Impact investing aims to create positive

social and/or environmental impact, alongside financial returns. With the proliferation of new players, approaches, financial instruments and evaluation tools, the field of impact investing has significantly progressed in recent years to tackle an array of social issues. It will also cover instruments like Social Impact Bonds designed for specific projects and crowdfunding. The course is designed to be an introduction to impact investing: how the industry has emerged, why it is gaining prominence, and where it is going. It will explore its roots in micro-finance, its influence on business and philanthropy, as well as the opportunities and challenges ahead.

- **Financing and Assessing Social Impact** is built assessments of social enterprise and returns on social investments. This piece will be most valuable for professionals working in social enterprise, but will also inform the investor on how these instruments work to produce desired outcomes. Impact Analysis includes a detailed measurement of social enterprise outcomes, and analyzing individual organizations will form a key deliverable for this course. There are also established metrics, such as the Progress out of Poverty Index, some of which have been developed from environmental impact metrics, and metrics for measuring corporate social responsibility, as well as an active scholarly literature on impact assessment. Students will gain a perspective on the history and best practice in social impact assessment, and how it is linked to financial instruments.

  Course Objectives

  - Develop an understanding of the social context in both developed and developing countries leading to broad measures of social well being.
  - Understand and use Impact Assessment as it applies to hypothetical and existing social enterprises.
  - Evaluate the use of Impact Assessments amongst financial institutions.
  - Communicate the merits and structure of Impact Assessments to a variety of stakeholders, and complete Impact Assessments.

- **A Capstone Project** will be completed after coursework, and will be created as a course taught by a single instructor. The projects will use archival data and interviews with industry professionals.[3]

For individual courses in the diploma, each of the course assessments reports (midterm and final examinations, projects and research papers) has been identified and cross-referenced with graduate level expectations which will be used by faculty as the rubrics that comprise the

[3] The workload will be the equivalent of a readings course, and less than an MRP.

marking scheme. These course assessments together with the deployment of the course-specific GDLEs when grading student learning and assessments ensure that learners have achieved the Program Learning Outcomes. The TRSM Grad Program Council, in considering, among other inputs, teaching evaluations submitted by the Graduate Program Director and learners, will decide annually whether it is necessary to augment the diploma's course content for currency with respect to professional changes and allied best practices.

The Program Learning Outcomes Chart and the Professional Master's Diploma Level Expectations (GDLEs) Chart below cross reference and illustrate the mapping of individual courses to the Diploma Program's Learning Outcomes, Methods and Assessment; and the charting of which individual Program Learning Outcomes address the enumerated, standard Professional Master's Diploma Level Expectations

Table 1
Graduate Degree Level Expectations

1. Depth and Breadth of Knowledge	A systematic understanding of knowledge, 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.	Courses 1-4 develop awareness of current problems and insights, by providing context on approaches to finance through a social lens (2 and 3) awareness of how government policy, and capital market structure support a wide range of enterprises (1) and finally, and overview of effective assessments of social enterprise and returns on social investment (4).

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; 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.	Courses 1-4 provide a graduate level introduction to the discipline of finance and social innovation, addressing conceptual understanding and financial competence, while the capstone project exposes the students to research related to the Social Innovation context, another aspect of this degree expectation. In particular Course 1 provides an introduction to Corporate and Non-Profit Management and scholarship, while courses 2-4 allows students to evaluate established financial principles and techniques in the context of complex social issues, addressing point “c”. The capstone project, along with case studies and exams addresses the need for written argument and original application of knowledge.
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.	The capstone project is designed to develop and strengthen research skills and encourages students to look at new questions in a socially innovative context, while course 2-4 provides a critical analysis of finance, investing and assessment in socially focused endeavor.

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; and b. The intellectual independence required for continuing professional development; c. The ethical behaviour 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.	All four Courses address the skills needed to be successful both in the classroom, and in professional settings by developing written and oral communication skills. Ethical decision making and academic integrity are stressed throughout the four courses. The Social Innovation context is a new and particular context for most students, and better understanding of it should improve student's professional capacity and autonomy.
5. Level of Communication Skills	The ability to communicate ideas, issues and conclusions clearly.	While all four Courses address these points, course 4 in particular encourages students to effectively communicate the impact that business decisions have in socially focused organizations.
6. Awareness of Limits of Knowledge	Cognizance of the complexity of knowledge and of the potential contributions of other interpretations, methods, and disciplines.	The individual capstone project will provide students with the opportunity to experience complexity and limitations in the application of management to specific areas of research.

1.4 Program Content.

The program content is consistent with the state of the art in the field of finance, but represents an emerging area of study in this area. It draws on the subfields of corporate

governance, behavioural finance, business ethics, and management. The courses, which are cross listed with the MBA, will be consistent with MBA level courses, in that they will have a mix of case studies, lectures, and assignments that cover how finance for social innovation is being developed, and the history of its development since the 1970s, in both the developed and developing world. Students will also need to become proficient in the range of financial instruments covered in the courses. This area represents a small, but growing area of research within the field of finance and economics. It is also an active area in several fields of social science, including sociology, social services, economics, and management.

All courses are required for the diploma.

There is no comparable program in Ontario. However, there are individual courses in other MBA programs, similar to the Impact Investing course, such as the Rotman School of Management and Schulich School of Business. There is some overlap with the governance course in introductory courses in programs designed to train directors for the boards of publicly held corporations. The lack of similar programs, and the proximity to so many social enterprises makes this program very attractive at this time.

There are, however a number of shorter, private sector, or non-profit sector organizations providing short courses in this area, such as Acumen (http://plusacumen.org/courses/social-impact-2/).

1.5 Mode of Delivery[4]

The courses are planned for classroom delivery, in a manner consistent with MBA pedagogy. This includes an active learning environment that includes case studies, instruction in the financial instruments, short lectures, guest speakers from industry and student presentations.

1.6 Assessment of Teaching and Learning

The PMD directly addresses Ryerson's mission:

> "The special mission of Ryerson University is the advancement of applied knowledge and research to address societal need, and the provision of programs of study that provide a balance between theory and application and that prepare students for careers in professional and quasi-professional fields.

[4] Equivalent to section 1.5 of the proposal submission template of the Ontario Universities Council on Quality Assurance.

> As a leading centre for applied education, Ryerson is recognized for the excellence of its teaching, the relevance of its curriculum, the success of its students in achieving their academic and career objectives, the quality of its scholarship, research and creative activity and its commitment to accessibility, lifelong learning, and involvement in the broader community."

Its content is balanced between knowledge, theory and skills, and aims to address a need for education on the financial instruments and institutions used to finance social enterprise and innovation, which is a model for solving social problems founded upon market-based delivery of services and solutions to problems, rather than on a charitable or government funding of such activities. It will also contribute to the mission of graduate education at Ryerson to "Enable greater student engagement and success through exceptional experiences" as expressed in the 2014-2018 Academic Plan "Our Time To Lead." The PMD also directly addresses the following strategies for graduate education in that plan:

- Attract top graduate students by developing a strategic approach to domestic and international recruitment, and fostering excellence in graduate student supervision.
  - This is an innovative program that brings a finance expertise to an emerging industry, which should attract the of interest of many high quality students interested in financing market based solutions to social problems, or investing in such ventures.
- Strengthen graduate education by introducing a new funding allocation mechanism, identifying ways to improve the administration and delivery of graduate education, and implementing policies that support program quality and timely program completion.
- Continue master's and doctoral program development subject to appropriate government funding.
  - This program is cost recovery, which is a new funding mechanism for the MBA program.

For individual courses in the diploma, each of the course assessments reports (midterm and final examinations, projects and research papers) has been identified and cross-referenced with graduate level expectations which will be used by faculty as the rubrics that comprise the marking scheme. These course assessments together with the deployment of the course-specific GDLEs when grading student learning and assessments ensure that learners have achieved the Program Learning Outcomes. The TRSM Grad Council, in considering, among other inputs, teaching evaluations submitted by the Graduate Program Director and learners, will decide annually whether it is necessary to augment the diploma's course content for currency with respect to professional changes and allied best practices. Students will be assessed in the same fashion they are assessed in the MBA program, which emphasizes active learning in the classroom, both individual and group assignments, written and oral presentations and exams. The same standards used in the MBA program towards achieving program-level goals will be applied to the courses in this diploma.

The Program Learning Outcomes Chart and the Professional Master's Diploma Level Expectations (GDLEs) Chart above cross reference and illustrate the mapping of individual courses to the Diploma Program's Learning Outcomes, Methods and Assessment; and the charting of which individual Program Learning Outcomes address the enumerated, standard Professional Master's Diploma Level Expectations

1.7 Resources

a) *Adequacy of utilization of existing human, physical and financial resources*

As will be detailed below, Ryerson University commits the Deans, select faculty, and administrative teams of the Yeates School of Graduate Studies, the Faculty of the Ted Rogers School of Management and its centralized university-wide services to support the delivery of this diploma program.

Physical Space will be provided within the Ted Rogers School of Management, by utilizing the dedicated classrooms for the MBA Programs, along with cubicles with personal storage spaces for students, a kitchen room, and an the MBA workroom. These dedicated spaces are accessible only to PMD, MBA, and MScM students and staff.

b) Faculty Collaboration

This proposed diploma is a collaborative effort between Ryerson MBA Programs and the Yeates School of Graduate Studies, supported by theTed Rogers School of Management Graduate Program Council.

c) Faculty Resources

Qualified instructors will be engaged to present curricular material. These may include faculty members, adjunct faculty members and others, as appropriate. Faculty members have been identified with the academic background and expertise to be able to provide the necessary instruction, guidance and leadership to make the proposed program a success. To demonstrate their quality, their curriculum vitae are found in Appendix D.

Several Faculty members have been identified with the academic background and expertise to be able to provide the necessary guidance and leadership to make the proposed program a success. These are listed in the table below. However, the program also enjoys the support of additional members of the School of Accounting and Finance within TRSM who are also members of the Yeates School of Graduate Studies, an whose CVs are included in the Appendix.

Table 2 Faculty

Faculty Member	Home Unit	Relevant Area(s) of Expertise
Asher Alkoby	Business Law, SBM, TRSM	CSR, Government Relations, Social Innovation
Kimberly A Bates	Entrepreneurship & Strategy, SBM, TRSM, MBA	Corporate Governance, Strategic Management
Wendy Cuker	ITM, TRSM	Social Enterprise, Social Finance
Narinder Dhami	Adjunct Faculty (planned)	Social Enterprise, Social Finance
Allen Goss	Finance Department, SAF, TRSM	Corporate Governance, Behavioural Finance
Alison Kemper	Entrepreneurship & Strategy, SBM, TRSM,	Social Enterprise, Non Profit, Corporate & Non Profit Governance
Gil Lan	Business Law, SBM, TRSM	Corporate Governance
Chris MacDonald	Child and Youth Care, FCS, John C. Eaton Chair	Social Enterprise, Social Finance
Ayse Yuce	Finance Department, SAF, TRSM	Islamic Finance, Investments & Portfolio Analysis (aka Investments for Today's Managers, MB 8109)

The MBA Program, and TRSM as a faculty have sufficient faculty who can teach the courses in this program, although we envision hiring industry experts, including Ms Dhami, listed above, who can teach at least one of the courses, and work to mentor students.

The development of this diploma will take place between now and the 2016-17 academic year primarily by professors in TRSM, but with input from practicing professionals within the social finance and social innovation sector. We plan to admit an average of 25 students annually, but would be willing to admit up to 50 students. Narinder Dhami, will serve as an adjunct faculty member for the program, and consult on the curriculum, assist with recruiting and mentor students who hope to enter this sector. Other industry professionals will be recruited as needed.

Ryerson Library Resources

1.1.1. Collections

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The collection development philosophy is very much holistic in its intent. In response to the rise of interdisciplinary studies in the academy, the Library has ensured that librarians engage in collection development not motivated by strict subject silos, rather by the needs of all program areas. Collection decisions are made to improve resources for all users. Making new acquisitions available is the priority, and there is less concerned about which subject area should pay for it. This has made the Library nimble in identifying areas in need of strengthening and lessened the bureaucracy involved in making collection decisions. All efforts are made to fulfill requests of faculty and students, within reason.

Similarly, a committee comprised of librarians representing all subject areas gets requests for new serials and electronic resources. The committee considers all requests and approvals are granted based on a myriad of factors, including usability, cost, access, and relevance to programs of study at Ryerson.

Where at all possible, the Library works with national and provincial consortiums, the Canadian Research Knowledge Network (CRKN) and the Ontario Council of University Libraries (OCUL) to negotiate licenses for electronic resources. This increases purchasing power, and allows for assurance that the content purchased is archived in perpetuity on servers housed at University of Toronto via the Scholarsportal initiative.

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1.1.3. In Person Services

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E-reserve services are available via D2L to provide access to course materials on a 24/7 basis.

1.1.5. Drop-in Workshops

The Library provides a variety of drop-in workshops for students wishing to learn more about resources and services. These include sessions on mastering searching our electronic resources. These workshops are offered at varying times of the term, but there are always time slots available that are convenient to graduate students.

1,8 Resources for Graduate Programs

The courses have been developed in conjunction with the MBA Program Director and associated graduate faculty. This diploma program has four courses, plus a capstone, and the faculty identified above are fully capable and qualified to teach these courses. There are approximately 125 MRPs completed each year in the MBA programs, and multiple supervisors who are capable of supervising the capstone project course. The Ryerson MBA Program faculty has demonstrated an ability to manage a consistent stream of capstone projects.The MBA has access to faculty members across TRSM, as well as practicing professionals who regularly teach in the program; we believe that there is sufficient capacity to delivery the program. There are approximately 62 sections in the MBA program annually, and approximately 50 members of TRSM who are members of YSGS.

1.9 Resources for Undergraduate Programs

N/A

1.10 Quality and other indicators

This proposal, once approved, shall be governed by the TRSM Graduate Program Council, in particular the curriculum committee. Attracting high quality international students to the MBA Program is a key concern, and will be regularly monitored by the Curriculum Committee and the Admissions Committee.

The TRSM Graduate Program Council will have primary responsibility for

1. coordinating program curriculum development;
2. liaising with the relevant teaching departments and the Graduate Advisor for the diploma;
3. ensuring the quality, currency, and content of constituent courses;
4. assuring course staffing strategies are appropriate, including the recruitment and qualifications of diploma faculty;
5. undertaking the ongoing review of program objectives, learning outcomes, and career competencies, and

This professional master's diploma program will be governed by Ryerson's Institutional Quality Assurance policies[5] and the collaborative governance model. These policies include, among others, 110, 112, 126, 127 and 142.

Over time this diploma will enhance Ryerson and TRSM's credibility as an institution that is seeking to educate professionals in ways that benefit society, and that differentiate its home program from other MBA programs by providing practical skills for professionals working in the social enterprise and social innovation sector, and in financial services. Relationships with professionals and organizations developing instruments aimed at financing social enterprise will be developed. This will likely mean that the program will expand the offerings. At this time we can anticipate the need for further development, but it is difficult to predict the actual needs arising.

The Academic Home for these courses will be MBA Programs in the Faculty of the Ted Rogers School of Management (TRSM). All the courses are being developed for this program are being developed by faculty within Ted Rogers School of Management who are members of the Yeates School of Graduate Studies. MBA Programs will cross list all PMD courses as electives, bringing MBA students with an interest in this sector into the classroom with PMD students, which is expected to enhance the level of discourse. Currently the MBA Programs send approximate 6 students to funded internships in social enterprise and non-profits each year, including a partnership with Canadian Executives Services Overseas, and this area is a priority. All these resources make the MBA an ideal home program for this PMD.

3. Appendices: CVs, to be added

[5] http://www.ryerson.ca/senate/policies/IQAP-policies.pdf