Date: Monday 16 April 2018
Time: 3:30 p.m.
Place: Needles Hall, room 3407

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>3:30</td>
<td><strong>Consent Agenda</strong></td>
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<td><strong>Motion:</strong> To approve or receive for information by consent items 1-6 below.</td>
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<td></td>
<td>1. Minutes of the 26 March 2018 Meeting</td>
<td>Decision</td>
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<td>2. Reports from Committees and Councils</td>
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<td>a. Graduate &amp; Research Council</td>
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<td>b. Undergraduate Council</td>
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<td>3. Report of the President</td>
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<td>a. Recognition and Commendation</td>
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<td>4. Report of the Vice-President, Academic &amp; Provost</td>
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<td>a. University Professor Designation</td>
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<td>5. Report of the Council of Ontario Universities Academic Colleague</td>
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<td>6. Reports from the Faculties</td>
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<td><strong>Regular Agenda</strong></td>
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<td>3:35</td>
<td>7. Business Arising from the Minutes</td>
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<td>3:45</td>
<td>8. Presentations by Association and Federation Presidents</td>
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<td>a. Bryan Tolson, President, Faculty Association of University of Waterloo</td>
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<td>3:50</td>
<td>b. Robert Bruce, President, Graduate Student Association</td>
<td>Information</td>
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<td>3:55</td>
<td>c. Antonio Brieva, President, Federation of Students</td>
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<td>4:05</td>
<td>9. Reports from Committees and Councils</td>
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<tr>
<td></td>
<td>a. Executive Committee¹</td>
<td>Decision</td>
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<tr>
<td>4:15</td>
<td>b. Graduate &amp; Research Council</td>
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<td>4:25</td>
<td>c. Undergraduate Council</td>
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<td>4:35</td>
<td>10. Report of the President</td>
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<td>4:45</td>
<td>11. Q&amp;A Period with the President</td>
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<td>5:05</td>
<td>13. Report of the Vice-President, University Research</td>
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<tr>
<td>5:10</td>
<td>14. Other Business</td>
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<td>5:15</td>
<td>15. Minutes of the 26 March 2018 Meeting</td>
<td>Decision</td>
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¹ This report re: Elections to Senate Committees and Councils and to the Board of Governors will be at members’ places.
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<thead>
<tr>
<th>Time</th>
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<tr>
<td>5:20</td>
<td>16. Business Arising from the Minutes</td>
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<td>5:25</td>
<td>17. Report of the President</td>
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<td>5:30</td>
<td>18. Other Business</td>
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26 March 2018

Karen Jack
University Secretary
Secretary to Senate
University of Waterloo
SENATE
Minutes of the Monday 26 March 2018 Meeting


Guests: G. Wayne Brodland, Bruce Campbell, Aldo Caputo, Wayne Chang, Jake Fisher, Amanda Garcia, Matthew Grant, Michael Jack, Ryan Jacobs, Ross Johnston, Jennifer Kieffer, Quinlan Lee, Derek Madge, Nick Manning, Walter Mittelstaedt, Anton Mosunov, Diana Parry, Chris Read, Emily Schroeder, Julie Kate Seirlas, Daniela Seskar-Hencic, Nadia Singh, Allan Starr, Sean Thomas, Mark Weber, Dandi Zhao


*regrets
**telephone

OPEN SESSION

Dixon advised members of the president’s regrets and chaired the meeting in his stead. He noted that the reports from the teaching awards committees are at members’ places and invited the secretary to speak to the results of nominations for Senate vacancies, which she did. Members heard that all faculty and faculty-at-large seats were acclaimed with the following senators to begin their three year terms on 1 May 2018: Richard Staines, kinesiology; Fraser Easton, English language and literature; David Clausi, systems design engineering; Peter Deadman, geography and environmental management; Martin Karsten, computer science; Barbara Moffatt, biology; Kankar Bhattacharya, electrical and computer engineering; Joan Coutu, fine arts; Eric Croiset, chemical engineering; Rob Gorbet, knowledge integration; Kelly Grindrod, School of Pharmacy; Kesen Ma, biology; Ian Milligan, history, Erin O’Connell, geography and environmental management. Elections for two graduate student representatives, Linda Ogechi Iheme and Max Salman, and one environment undergraduate representative, Fred Chereshski concluded today. [Secretary’s note: elections for the St. Jerome’s University representative and St. Paul’s University College representative also concluded on 26 March, Steven Bednarski and Teferi Mergo, respectively.]

Consent Agenda

Senate heard a motion to approve or receive for information the items on the consent agenda.

Dea and Beckett.
1. **MINUTES OF THE 26 FEBRUARY 2018 MEETING**
   Senate approved the minutes of the meeting.

2. **REPORTS FROM COMMITTEES AND COUNCILS**
   **Undergraduate Council.**
   **Faculty of Environment, Concurrent Degrees**
   Senate heard a motion to approve revisions to the section of the undergraduate calendar titled “Overview of Plans, Sub-Plans, Course Enrolment, and Grading… Concurrent Degrees”, effective 1 September 2019.

   **Faculty of Environment, Counting Courses**
   Senate heard a motion to approve revisions to the section of the undergraduate calendar titled “Overview of Plans, Sub-Plans, Course Enrolment, and Grading… Counting Courses”, effective 1 September 2019.

   **Faculty of Environment, English Language Communication Requirement for Knowledge Integration**
   Senate heard a motion to approve revisions to the section of the undergraduate calendar titled “English Language Communication Requirement”, effective 1 September 2019.

   Senate received the remainder of the report for information.

3. **REPORT OF THE PRESIDENT**
   **Recognition and Commendation.** Senate received the report for information.

4. **REPORT OF THE VICE-PRESIDENT, ACADEMIC & PROVOST**
   **Retail Services – Department Name Change**
   Senate heard a motion to recommend to the Board of Governors the following name change: “Retail Services” to “Print and Retail Solutions.”

   **Campus Wellness – Department Name Change**
   Senate heard a motion to recommend to the Board of Governors the following name change: Campus Wellness be the department name which will encompass Counselling Services, Health Services, and Health Promotion.

5. **FROM THE FACULTIES**
   Senate received the reports for information.

   The question was called, and the motion carried unanimously.

6. **BUSINESS ARISING FROM THE MINUTES**
   **2+2 Agreements.** Coniglio briefly spoke to the report provided by Ian Rowlands, associate vice-president, international. In discussion: a concern that they all exist in one country, and advice that Waterloo International is reviewing with an eye toward diversity; 725 students, primarily in science, have been involved with these plans; Rowlands could better advise re: other universities’ involvement with such programs; advice from Culham that co-op precludes engineering’s involvement; the university decided early on that these plans will be one directional; a suggestion that the University consider expanding beyond China in its next strategic plan.
7. REPORTS FROM THE TEACHING AWARD COMMITTEES
Coniglio and Casello spoke to the awards and introduced those winners in attendance at the meeting. A round of applause followed as did personal congratulations from the chair.

Amit and Meena Chakma Awards for Exceptional Teaching by a Student Committee
Senate received the report for information.
Distinguished Teacher Award Committee
Senators received the report for information.

8. TEACHING PRESENTATION
Following an introduction by Coniglio, Wayne Brodland, Civil & Environmental Engineering presented to Senate on “How physical models can unseat deeply-held misconceptions.” Members heard about the value that models have in clarifying concepts, demonstrating difficulties and dismissing misunderstandings. Using several examples in the room and the internet, Brodland demonstrated several structural and design concepts.

9. REPORTS FROM COMMITTEES AND COUNCILS
During this part of the meeting, Charmaine Dean assumed the chair.

Finance Committee
Speaking to his presentation, Dixon referenced the proposed 2018-2019 operating budget and the supplementary data set distributed with the agenda. He advised: as usual, some information is estimated; the deficit is not concerning to him as mechanisms exist for managing it through the course of the year; the importance of meeting enrollment targets; the budget is conservative. Senate heard a motion to recommend that the Board of Governors approve the 2018-2019 Operating Budget. Dixon and Karigiannis.
In response to questions, members heard: details re: expenses by units is available in the detailed financial statements provided in the fall, but not in the annual budget which contains a lot of estimated information, and if provided now would necessarily change; salary information provided is for all employees budgeted, and the financial statements provide greater detail; scholarships available to graduate students; anecdotally, some reasons for increased non-academic staff, including the need to manage regulatory requirements for example in the Office of Research, and increases to support student services; the graduate incentive fund represents only a part of potential funding for students; a reorganization in Health Services is likely the cause of a decrease there; the staff count indicated for the chief information officer does not include information technology staff within the Faculties.
Carried unanimously.

Undergraduate Council
Following an introduction by Coniglio, Senate heard a motion to approve the inactivation of the Faculty of Environment’s Knowledge Integration Option, effective 1 September 2019. Coniglio and Gorbet. Carried unanimously.
10. REPORT OF THE VICE-PRESIDENT, ACADEMIC & PROVOST

Undergraduate and Graduate Admissions Update. Newell Kelly and Casello presented information on undergraduate admissions and graduate student applications for the coming cycle, advising that, at the undergraduate level, the University is generally on target and more information will follow as numbers become firmer, and at the graduate level, the University will meet provincial targets, the desire to increase domestic applicants, particularly at the PhD level, and quality remains high. In response to a question, Casello also spoke to work being done in his office to review and improve funding opportunities.

Conrad Business, Entrepreneurship and Technology Centre. Culham spoke to the proposal to change the name of the Conrad Business, Entrepreneurship and Technology Centre to the “Conrad School of Entrepreneurship and Business” within the Faculty of Engineering, and Senate heard a motion to recommend the change to the Board of Governors.

Culham and Peers.

In discussion, including input from Mark Weber, the Centre’s director: concern that there exists a lack of infrastructure with respect to “business” initiatives, and a response that last year’s report on “business” at Waterloo guides the University in this area; feedback that the University should be more strategic with respect to its business activities and should consider in its next strategic plan a Faculty of Entrepreneurship or a Faculty of Business; a suggestion that the report on business cited earlier contained a recommendation for the formation of a school of business, and clarification that it did not; confirmation from the Secretary that Senate has the power to recommend to the Board the creation of academic units, as it did last month with the school in Stratford; the proposed school received unanimous support at Engineering Faculty Council; in response to a concern that arts teaches the Centre’s courses now and engineering will increase its faculty complement with this school, clarification that most of the Centre’s courses are taught by engineering faculty; confirmation that there is no intent to limit commercialization opportunities; in response to a suggestion that a better fit might be for the unit to be a subset of management sciences due to its small size, a statement that management sciences is a close collaborator but has a different thrust, and the proposed school’s size is in line with other schools when they began; agreement that strong messaging to the community about opportunities, some of which are being worked on, will be available to students beyond engineering is needed; a concern that Senate Graduate and Research Council (SGRC) did not have an opportunity to consider the proposal, and with the use of “school”; a suggestion that policies be changed to allow Centres to hire, etc., instead of having to create a new academic unit.

Senator Freeman proposed to make a motion that the matter be referred to SGRC and the Secretary stated that the motion was inappropriate because the proposal did not derive from that council.

[Secretary’s note: Senate’s lack of rules of order notwithstanding, for clarity, the power to create academic units resides with the Faculties (as articulated in their constitutions), then Senate and the Board (as articulated in the University of Waterloo Act) and not with SGRC, so to send it there would not resolve properly the request for that body to discuss the appropriateness of forming the academic unit since it has no authority in the creation of them.]

The chair tabled the motion.

11. REPORT OF THE VICE-PRESIDENT, UNIVERSITY RESEARCH

Senate received the report for information.

12. OTHER BUSINESS

Senator Gerrits moved that Dr. John Hirdes, chair of the implementation committee of the report on student mental health, provide an update on progress to Senate each term.
Gerrits and Wray.

In discussion, the chair advised that since the committee is not accountable to Senate, but instead to the president, it is more appropriate that he update Senate about the committee’s activities on a regular basis.

With Gerrits and Wray’s agreement, the motion was withdrawn.

Senate convened in confidential session.

26 March 2018

Karen Jack
University Secretary
Secretary to Senate
The confidential minutes have been removed.
Senate Graduate & Research Council met on 12 March 2018 and agreed to forward the following items to Senate for information as part of the consent agenda.

Further details are available at: https://uwaterloo.ca/secretariat/committees-and-councils/senate-graduate-research-council

FOR INFORMATION

CURRICULAR SUBMISSIONS
On behalf of Senate, minor program revisions, new courses, course inactivation, and minor course revisions were approved for the Faculty of Arts (economics, digital experience innovation, political science, psychology), Engineering (department of electrical and computer engineering), and Mathematics (centre for education in mathematics and computing, computational mathematics, computer science, pure mathematics).

OFFICE OF RESEARCH
On behalf of Senate, council approved the following Research Ethics Committee continuing membership items: (1) renewal of member for 1-year term, and (2) revised role of member (nursing/medical representative becoming community representative).

GRADUATE AWARDS
On behalf of Senate, council approved the Wendy Mitchinson Graduate Award in History (endowment) and the David and Elizabeth Kerr International Experience Award (trust).

/kw

Jeff Casello
Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Charmaine Dean
Vice President, University Research
Senate Undergraduate Council met on 13 March 2018 and agreed to forward the following items to Senate. Council recommends that these items be included for information or approval, as noted, in the consent agenda.

Further details are available at: uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council

FOR APPROVAL

ACADEMIC REGULATORY CHANGES

Faculty of Applied Health Sciences
School of Public Health and Health Systems

1. **Motion:** That Senate approve the following revisions to admission requirements for the Diploma in Gerontology, effective as of 1 September 2019.

**Background and Rationale:** The current text can be found at: http://ugradcalendar.uwaterloo.ca/page/AHS-Diploma-in-Gerontology

Text with revisions inline (strikeout = deleted text, bold = new text):

The Diploma in Gerontology program is available to students who would like some training in gerontology but are not able to complete all the requirements of a School of Public Health and Health Systems undergraduate degree.

**Admission Requirements:**
The following are considered minimum admission requirements. Students will be considered on an individual basis to determine admissibility to the program.
1. Completion of a minimum of 2 years (4 semesters totalling 10.0 units) or equivalent of university postsecondary study prior to beginning the diploma program.
2. BIOL 130 or equivalent, or HLTH 103 or equivalent, within the past five years.

Rationale for the proposed revisions: The diploma would be appropriate additional training for paramedics, social service workers, occupational therapy assistants, and physiotherapy assistants, all of whom train in programs at Community College. This change would allow admission to those Community College graduates. The standard average requirements for admission to SPHHS from Community College would apply.

FOR INFORMATION

CURRERICULAR MODIFICATIONS

1. Council approved the following on behalf of Senate:
   - minor plan changes for: the Faculty of Applied Health Sciences (kinesiology (honours),
human nutrition (minor), recreation and leisure studies (honours, four-year general, joint honours), recreation and sport business degree (honours), therapeutic recreation (honours), tourism development (honours), bachelor of science, health studies (honours), bachelor of public health (honours), pre-clinical specialization, health research specialization); Faculty of Arts (drama and speech communications (three-year general, four-year general, honours, minor)); Faculty of Engineering (complementary studies requirements, statistics (option)); the Faculty of Science (geophysics specialization, pharmacy degree requirements).

- new courses for the Faculty of Arts (anthropology, gender and social justice).
- course changes for the Faculty of Applied Health Sciences (School of Public Health and Health Systems, recreation and leisure studies); Faculty of Arts (anthropology, music, peace and conflict studies, classical studies, drama and speech communications, English language and literature, fine arts, history, philosophy, religious studies, sociology, legal studies, Spanish and Latin American studies, gender and social justice, studies in Islam); Faculty of Science (biology, chemistry, earth, pharmacy, science and business).
- course inactivations for the Faculty of Applied Health Sciences (recreation and leisure studies); Faculty of Arts (sociology, women’s studies).

Mario Coniglio
Associate Vice-President, Academic
FOR INFORMATION

Recognition and Commendation

The winners of the 2018 HeForShe Writing Contest were announced at the International Women’s Day dinner at Federation Hall on Friday, March 2, 2018, and their work has been published in a special anthology presented by the Book Store and Writing Centre in support of the HeForShe 10x10x10 IMPACT framework. For the first time, content was provided by not only Waterloo students, faculty, staff, and alumni, but also by high school students from the Waterloo Regional District School Board (WRDSB). Participants were asked to consider how gender equity fits into a larger equity story, and explore where there are overlaps and connections between gender and race, ethnicity, age, ability, class, faith and/or sexuality. “Our commitment to gender equity is not something we take lightly,” wrote Feridun Hamdullahpur. “This collection of poetry, fiction and non-fiction prose from students, faculty, staff and alumni strengthens our resolve to focus on equity in general and gender equity.” Along with the six winning entries, 35 other pieces were also selected for inclusion in the anthology. Each entry was reviewed by a panel of judges from both the University and WRDSB.

Category winners included:

- Waterloo Creative Non-Fiction Winner: Michelle Pressé (Office of Research)
- WRDSB Creative Non-Fiction Winner: Kaleigh Wiens*
- Waterloo Poetry Winner: Eleanor Sudak
- WRDSB Poetry Winner: Lama Abdallah*
- Waterloo Fiction Winner: Sanjay Veerasammy
- WRDSB Fiction Winner: Rose Danen*

*high school entrant

(adapted from the Daily Bulletin, 8 March 2018)

This year’s World’s Challenge Challenge competition saw competitors addressing one of the United Nations’ Sustainable Development Goals and developing a possible solution to tackle the global problem. The issues at hand included clean water and sanitation, access to reliable and affordable electricity, and sustainable agriculture practices to help reduce hunger. Teams came from diverse academic backgrounds, with representation from Science, Engineering, Math, Applied Health Sciences, Environment and Arts. Up for grabs was $1,000 for each member of the first place team and a spot in the International Round at Western University in June, where teams will compete for a share of $45,000. CataLight was awarded first place for their solution to Global Goal #6: access to clean water and sanitation for all. CataLight recently started working out of the Velocity Science discovery lab on-campus at the University of Waterloo to develop the science behind their water treatment technology. As part of the United Nations’ 6th Sustainable Development Goal, CataLight has set a target to achieve universal and equitable access to safe and affordable drinking water for all by 2030.

TABS won second place and a Kobo Aura eReader for each team member for their modified rainwater collection system, to be implemented in communities in the Mekong Delta in Vietnam. Drops for Crops was awarded third place and a Fujifilm Instax camera for each team member for their specialized, low-waste irrigation system, designed for use initially in Tanzania. (adapted from the Daily Bulletin, 9 March 2018)
Co-operative Education and Work-Integrated Learning Canada (CEWIL) named Science student Emily Pass the winner of the national Co-op Student of the Year Award. Pass is the third Waterloo student to win the CEWIL award in the last four years. She also won the top prize in the province, the Education at Work Ontario (EWO) Co-op Student of the Year Award, as well as the Waterloo Faculty of Science Co-op Student of the Year Award.

This summer, Pass worked as a research assistant at Western’s Centre for Planetary and Space Exploration. She designed and implemented the software, algorithm and code for the telescope array, Colibri. The new technology monitors light curves for geometric diffraction patterns, allowing scientists to know the size and orientation of an object that passes through an area of space. Her findings were published in a 13-page paper in the academic journal, *Publications of the Astronomical Society of the Pacific*, a well-respected publication in the field.

Pass credits her first co-op work term as a quality assurance developer for Validus Research Inc. for her success in developing Colibri’s rapid-imaging program. The field of quality assurance changed the way she thought of testing and problem-solving. Since then, her work terms have explored different areas of astronomy. She has worked as a research assistant at Dalhousie University investigating galaxy protoclusters, Kuiper Belt objects at Western and next summer she’ll study exoplanet atmospheres at McGill. (adapted from the *Daily Bulletin*, 20 March 2018)

The Distinguished Teacher Awards for 2018 were announced at the March meeting of Senate, and will be presented to four faculty members at Convocation.

- Wayne Chang, Conrad Business, Entrepreneurship and Technology Centre;
- Shannon Dea, Philosophy;
- Jake Fisher, Chemistry; and
- Julie Kate Seirlis, International Development.

Wayne Chang (lecturer, Conrad Business, Entrepreneurship and Technology Centre)

As the Enterprise Co-op Program Coordinator, Wayne Chang has had an outstanding influence on the students he teaches. One of his undergraduate students commented that “his practical approach and his ideas of process over product allowed for a course that I won’t forget after the exam.” He has supported several students through the Enterprise Co-op Program who have gone on to become CEOs of their own companies. One such student noted that “Wayne’s mentorship and guidance does not end when the semester does. He continues to have one of the most genuine interests in his student’s lives that I have ever seen.” Chang has been recognized by his students for human qualities “beyond his wealth of technical know-how and teaching excellence.” One alumus recounted “countless late nights engaging in valuable discussion” with Chang and acknowledged that he “repeatedly placed his reputation on the line” to guide his students to success. Wayne Chang has had the honour of being recognized for teaching excellence from the Dean of Engineering and received the Outstanding Performance Award in 2014.

Shannon Dea (associate professor, Philosophy)

Associate Professor of Philosophy Shannon Dea has been called a “champion of the Women Studies program.” One of her graduate students noted, “I definitely feel like I’ve learned and still learn a lot from Prof Dea. Nearly every day I’ve left a class of hers, my head feels like it’s just buzzing and brimming with new information and ways of thinking about aspects of the world I hadn’t considered before.” Colleagues commented that, “in a nutshell, Shannon does the unexpected in her teaching. She uses the unexpected and untraditional for several reasons, including: it keeps the learning atmosphere interesting, and it allows her to personally model risk and innovation to her students.” Another colleague acknowledged that “risk-taking, of course, is only valuable if the risks are worthwhile, and all of Professor Dea’s risks both aim at improving student learning and the student experience, and are studiously informed by evidence and research.” Shannon Dea has previously been the proud recipient of the 2016 Arts Award for Excellence in Teaching and the 2012 Province of Ontario’s Leading Women Building Communities Award.
Jake Fisher (laboratory instructor, Chemistry)
Jake Fisher is a Lab Instructor in the Department of Chemistry and is renowned for his teaching by his students and colleagues alike. One of his undergraduate students remarked that “his course notes are the most well written and in-depth course notes I’ve come across during my undergraduate career. Jake is always welcoming and willing to help, his open-door policy for asking help ensures that students fully understand. You can tell that teaching is not just a job for him, but a passion.” Fisher was also recognized for his patience by a student: “I remember going to him with the same problem multiple times and he was always as patient as he was the first time. Patience is his character trait. It’s also great to know that someone as knowledgeable as Dr. Fisher is positive about the student’s growth and success.” Fisher’s approach to mentorship extends his impact to the Chemistry Department as a whole, as noted by a colleague: “Jake mentored me in such a way that I felt like I was responsible for supervising my students and not just simply ‘keeping an eye on them.’” Jake Fisher has had the honour of receiving the 2011 Excellence in Science Teaching Award.

Julie Kate Seirlis (assistant professor, International Development)
Julie Kate Seirlis is an Assistant Professor at St. Paul’s University College whose “transformative and memorable” teachings have inspired students, alumni, and colleagues. Nominees praise her “graceful guidance” in the development of students’ “tools for critical thinking.” Her undergraduate students value that she “constantly challenges her students to go further and deeper. She has a desire to produce critical thinkers, people who ask questions.” Graduate students are “motivated by her genuine interest and engagement with issues of environmental justice, and [are] powered by her creativity and experience in development work, research, and professorship.” An alumnus wrote: “I was able to look back and see that she had led us on a brilliant learning journey.” Several colleagues of Seirlis’s nominated her because “she has been a consistent voice of support, has connected us to many valuable contacts, and has encouraged us to bring our work into the academic sphere.”
(adapted from the Daily Bulletin, 27 March 2018)

The Amit and Meena Chakma Awards for Exceptional Teaching by a Student for 2018 were announced at the March Senate meeting, and will be presented to three student teachers at Convocation. The recipients are:

- Amanda Garcia, Systems Design Engineering
- Quinlan Lee, Economics, and
- Anton Mosunov, Pure Mathematics

Amanda Garcia is a PhD student in Systems Design Engineering. Students and faculty members recognized her as an approachable, knowledgeable, and dedicated instructor. A student remarked that “it was very clear that she wanted the students to succeed as she went about and beyond to set up one-on-one extra help sessions, was flexible on group extra help times, and was very quick to respond to email questions.” Another undergraduate student commented on her flexibility as an instructor, saying “Amanda was a great instructor because she was constantly willing to receive feedback and alter the way she was teaching the course for the better understanding of the students.” Garcia has also been described by faculty members as “extremely patient and understanding with students.” In 2017, she was the recipient of the University of Waterloo Certificate in University Teaching Award.

Quinlan Lee is an undergraduate student in Economics. Known by his students for his patience, Quinlan is recognized as “articulate, adept at breaking down difficult concepts and always adopts[ing] a genuine approach to guiding students toward a firm understanding of lecture material.” One student explained that “Quinlan provided a clear prospective on the material that goes beyond what was expected of a TA.” One faculty member noted that “the way he teaches the problems that we agree he will present and the way he explains how to tackle the problems are truly a complement to what I teach in class.”

Anton Mosunov, a PhD student in Pure Mathematics, is highly recognized for his dedication to learning and teaching. When asked about Anton’s impact on student learning, one undergraduate student explained that “he made the content interesting and easy to follow for every student. Not only did he provide great lectures, he also provided course notes and class videos to … ensure that we fully understood the material outside of class.”
Another student wrote that “at office hours, Anton was always helpful. Whether I had a question about the course content itself, or things beyond the scope of the course, he was always enthusiastic in answering, and recommended further reading to me which allowed me to learn much more than one course could teach.” In addition to his students’ support, a faculty member highlighted that “in all cases, he went well beyond what was expected of him and was an essential contributor to the success of the course.” His support serves as a testament to this recognition. (adapted from the Daily Bulletin, 28 March 2018)
University Professor Designation
The 2018 University Professor designation: Tamer Özsu (computer science).

Waterloo has awarded this distinction to 25 other individuals: Garry Rempel (chemical engineering), Mary Thompson (statistics & actuarial science) and Mark Zanna (psychology) in 2004; Terry McMahon (chemistry), Cam Stewart (pure mathematics) and Ian Munro (computer science) in 2006; Ken Davidson (pure mathematics), Keith Hipel (systems design engineering) and Jake Sivak (optometry) in 2007; Roy Cameron (health studies & gerontology) and Flora Ng (chemical engineering) in 2008; Ellsworth LeDrew (geography & environmental management) and Ming Li (computer science) in 2009; Stuart McGill (kinesiology) and Janusz Pawliszyn (chemistry) in 2010, Robert Le Roy (chemistry) in 2011, François Paré (french studies) in 2012 and Douglas Stinson (computer science) in 2013; William Cook (combinatorics and optimization), and William Coleman (political science) in 2015; Linda Nazar (chemistry) in 2016, Xuemin (Sherman) Shen (electrical and computer engineering); Joanne Wood (psychology) in 2017.

UNIVERSITY PROFESSOR
The University of Waterloo owes much of its international reputation and stature to the quality of its eminent professors. UW recognizes exceptional scholarly achievement and international pre-eminence through the designation “University Professor”. Once appointed, a faculty member retains the designation until retirement.

Not counting retirees, it is anticipated there will be one University Professor for approximately every 60 full-time regular faculty members, with at most two appointments each year. Such appointments are reported to Senate and the Board of Governors in March and April respectively, and are recognized at Convocation.

Selection Process

1. Annually, nominations will be sought from Faculty deans, directors of schools and department chairs, as well as from the university community generally. A nominee shall have demonstrated exceptional scholarly achievement and international pre-eminence in a particular field or fields of knowledge. The individual who nominates a colleague is responsible for gathering the documentation and submitting it to the vice-president academic & provost before the December break. The University Tenure & Promotion Committee will act as the selection committee; its decisions are final.

2. A nomination must be supported by at least six signatures from at least two UW departments/schools and must be accompanied by a curriculum vitae and a short, non-technical description of the nominee’s contributions.

3. A nomination must also be accompanied by letters from the nominee’s Dean, and from at least two and no more than five scholars of international standing in the nominee’s field from outside the University. The scholars are to be chosen by the nominee’s Chair/Director in consultation with the Dean and the nominator. The letter of nomination should explain why these particular scholars were chosen.

4. Letters soliciting comments from scholars shall be sent by the Chair/Director. Scholars shall be asked to comment on the impact and specific nature of the nominee’s most influential contributions, addressing their responses directly to the Vice-President, Academic & Provost.

5. The dossiers of unsuccessful nominees remain in the pool for two additional years. The appropriate Dean should provide updated information each year.

D. George Dixon,
Vice-President Academic & Provost
The academic colleagues met on February 13th and 14th in Toronto with a full agenda.

February 13th

During the dinner meeting the academic colleagues met with Julia Shin Doi (General Counsel and Secretary to the Board of Governors, Ryerson University) and Glenn Craney (Deputy Provost and Vice-Provost, University Planning Office, Ryerson University) to discuss governing board perspectives on government-mandated change initiatives. A summary of comments is included below:

• Colleagues indicated interest in learning more about the issues that fall under the purview of the board and senate; the role of faculty associations; the extent to which board membership reflects local communities or society; and the role of Executive Heads, particularly when there is disagreement between key stakeholders.
• It may be helpful to think about boards as providing direction, but not controlling institutions.
• Board secretariats often serve to help communication between stakeholders so that conflicts can be addressed, and work to ensure a collegial relationship between executive heads and board members. All board members act in the best interests of the institution.
• Communication is important at all levels. Part of good communications is managing expectations. When expectations are met, trust can be established and sustained. Communication between senates and boards is very important; the executive head helps keep communication lines open.
• Colleagues asked what types of topics would be discussed at the board level. For example, would the expansion of experiential learning be a board agenda item? It was discussed that while boards may have talked about this issue (and others like it), they would not get into detail.
• Communication was also emphasized in the discussion regarding government initiatives—in particular, it is important that government consult extensively with universities.
• Communication with government can at times be challenging; one reason for this is the timelines typically involved (often there is not much time for consultation). Communication is also constrained because of the political process; there are some limitations on what government can talk with universities about.
• Colleagues discussed the SMA process. It was noted that the SMA process was intended to start a longer conversation between government and universities; a pathway for clear communications is needed. Working toward SMA3 is one way to keep moving toward a strategic conversation with government.
• Differentiation is also an important issue—the government is working to set up broad priorities, and universities need space to pursue them in their own ways. The approach which utilizes some common and some differentiated metrics is one approach to thinking about broad principles and differentiation.
• Colleagues also discussed the ways in which government is a funder for higher education, but has no formal funding contract (as in k-12 education). There is no government mandate to fund postsecondary education; government funds PSE because it is good public policy. PSE funding is the third largest transfer payment in Ontario, after health care and k-12 education.
• Since 2006, there has been a shift in how universities are viewed by the public; universities are presently viewed as part of government (or the broader public sector). This may account for some of the ways government seems to be involved in university business.
• Boards and senates are both involved in the SMAs, but from different perspectives. One of the perspectives boards bring to SMA considerations is risk and risk mitigation.
• The five priority areas included in the SMAs are also priorities for institutions generally (boards and senates).
• Some advice was offered regarding working productively with government, including: keeping conversation with government active; working to understand what the government is focused on; considering a holistic approach, including a focus on opportunities rather than threats.
• Colleagues noted that government seems interested in managing the university sector as a system, but universities seek autonomy and differentiation. This may lead to tensions.
• Stability is also important—when performance measures change frequently, that’s when challenges arise. In some cases, government can move faster than universities are able.
• Experiential education is an important initiative government is focused on. One reason for this is because it is an issue with respect to the economy and the ways graduates get jobs. Universities, however, are increasingly asked to provide entry-level job preparation while employers are reducing training programs and activities. This shift is important because it shapes university work in very significant ways.
• Colleagues talked about the values to preserve in spite of the shifting context, including academic freedom, shared governance, and the important influences/changes a university education can bring to graduates. Colleagues also discussed the fact that academic freedom may be eroding as government initiatives increasingly shape university work. In this context, one is reminded that accreditation also influences the ways in which some programs are taught and/or designed, which is not new.

February 14th
During the debriefing meeting the academic colleagues highlighted the following important points from the dinner conversations:

(i) Government intentions are important to consider, but how interventions are interpreted is also important (as well as how they are filtered down through the system).
(ii) Three concepts may be important to remember given the changing environment, and as possible tools in resistance to government interventions: academic freedom, values, and self-governance.
(iii) Some mandated changes are incremental, and some are episodic (one-offs). While government may have good intentions, sometimes the effects are not positive.
(iv) As we get closer to SMA3, the risks may be higher for universities, as funding will likely be tied to metrics.
(v) Finally, colleagues agree that SMA3 will change things for universities, likely at all levels. As faculty and departments are influenced, more faculty engagement may be needed.

The academic colleagues then received the following COU update:

• Strategic Engagement campaign: The full report on the strategic engagement campaign is available on the website (www.ontariosuniversities.ca). Notes on specific issues are also included on the site. COU’s communications and government relations teams are also working on materials that universities might use in conversations with candidates. Strategies and tactics for working with a new government are a focus for COU, and will likely be brought to the Council meeting in April.
• Provincial budget: The federal budget, released on February 27, will be a factor in the provincial budget. The provincial budget will be the liberal election platform. COU is advocating for investments for universities, but with recent announcements (STEM and AI expansion, expansion of OSAP, the career ready funding, and costs associated with the equal pay for equal work legislation), we do not expect big investments to be included. (Note: While applications for admission to universities have not increased dramatically, applications to OSAP have increased. This is likely to create some cost pressures for government).
• **SMAs**: Universities are able to post their own SMA2 agreements, but government has not indicated when they will post. COU has learned that government will not post university targets side-by-side. COU is starting to think about SMA3 agreements. A technical table will be organized, and the group will provide options and advice. Two task forces are already underway (the OCAV Task Force, focused on access and equity; and the OCUR Task Force, focused on research metrics, community engagement, and innovation) and are exploring possible metrics. The task forces will circle back with COU members to consult on any proposed metrics. Since fall 2017, the OCAV Task Force has worked to develop a set of pilot projects, which all universities are engaged in. The pilot projects are focused on the collection and development of metrics for SMA3. The results of the projects will be analyzed to develop recommendations for a possible suite of standardized SMA3 metrics. The goal is to evaluate the proposed pilot metrics, consider whether they are scalable, and discuss how they might be used in funding. MAESD has signaled some funding support for these projects ($1M to be distributed across universities). Universities will launch the pilots in early 2018 and self-evaluations be completed very early in 2019.

• **Vector Institute**: The province has invested $30M for the expansion of artificial intelligence (AI) graduates; this funding is aimed at industry (The Vector Institute) rather than universities. Vector (and government) is focused on 1,000 additional AI master’s graduates. Funding will likely be directed to students as scholarships. Some funding may be used to support infrastructure to develop internships. Three types of activity are expected:
  o Support for existing programs that could be modified to include an AI focus;
  o New program development (using a cost-recovery model); and
  o The development of collaborative programs, with universities working together to deliver AI programs.

Vector has initiated a working group to develop minimum specifications for what may be considered an AI program. The Quality Council will be involved in these discussions. No new graduate spaces will be allocated, so if universities intend to increase enrolments and do not have room to grow, some reallocation of existing spaces will be needed. Enrolments can be expanded through cost-recovery programs. Currently, there are no policy parameters regarding cost-recovery programs. Increased demand is likely, so more consideration will be needed. The ministry may be willing to talk about OSAP eligibility for students in cost-recovery programs. Vector is working to award scholarships starting in Fall 2018.

• **STEM expansion**: the funding for AI sits within a context of STEM expansion. Because of recent enrolment growth in STEM, universities are well on the way to achieving the targeted growth. MAESD has no funding to support expansion; this will likely be negotiated as part of SMA3. Specific targets moving forward will not be decided until the budget is determined.

• **Fair Workplaces Act**: The recent legislation (formerly Bill 148) provides amendments to several acts, including the Labor Relations Act. The most significant impact is likely associated with the equal pay for equal work provision. Colleges and universities are exposed on this issue because of how the academic workforce is structured. The full impact of the legislation will not be known until universities work through contract negotiations and grievance processes. It is estimated that new requirements will cost at least $60M (not including the equal pay for equal work changes). COU has launched a process with a few universities to gather information related to risks and potential costs.

• **Capital Strategy**: The ministry has developed a capital strategy, with increased funding for facilities renewal. Details may be included in the provincial budget.

• **Greenhouse Gas initiative**: Government has allocated $300M to universities as part of the greenhouse gas initiative. Some universities are participating in the cap and trade process, and others are not (depending on emissions levels). Some funding opportunities may be provided to non-participating universities (for example, through a competitive innovation fund, or interest free loan).

• **Internationalization**: The ministry is developing an internationalization strategy for PSE. COU has worked to shape the development of the strategy; COU suggests that the strategy should be framed as an Ontario initiative, with an emphasis on economic development and growth.
- COU has received clear signals from government that it will not seek tuition regulation, and will not be initiating enrolment caps for international students.
- Government may be seeking assurances that universities are providing clear information to incoming international students regarding tuition increases while they are in program.

Following the COU update, the academic colleagues met with Harvey Weingarten, President and CEO, Higher Education Quality Council of Ontario, who discussed current issues in the postsecondary sector, focusing on change management. Key points of his discussion (which may shed light on the way government is recently approaching PSE) are summarized below:

- Institutional change is an important topic because a high-quality postsecondary sector is critical for economic progress and civil society. Institutions must be able to adapt and change (and improve). Harvey indicated that the PSE system in Ontario should refocus on quality. Funding is often the issue universities talk about, but quality should be the central focus.
- While institutions do change, programs are reasonably stable. A big change in the sector is the ways in which government is intervening today—more so in other jurisdictions in North America and the UK, but also in Ontario.
- Change is difficult for many reasons: Universities are not always motivated to change, and the conditions that might support change are not always available; Universities may have faculty members who are less engaged than others, but this issue is not easy to address; and Universities need a framework for change, but there is often the assumption that change takes place organically.
- Without change in the PSE system, it is possible that quality will diminish.
- The decisions that impact quality include: decreased funding for capital, larger classes and lacking/inappropriate measurement of student learning outcomes.
- Universities may focus on questions such as:
  - Are our universities best positioned (in organization and programs) to offer the highest quality programs and graduates?
  - Do our students have the skills and competencies necessary for the future?
  - What do our graduates need to look like, and what do they need to know (or do)?

The next Academic Colleagues meeting will coincide with the Council meeting and is scheduled for April 11th and 12th, 2018 (University of Windsor).

Marios Ioannidis
Academic Colleague to COU
FOR INFORMATION

A. APPOINTMENTS

Probationary-term reappointments

CHAURASIA, Ashok, Assistant Professor, School of Public Health and Health Systems, July 1, 2018 – June 30, 2021. Postdoctoral fellow, NIH, Institute of Child Health and Human Development; 2013-2015; Ph.D. University of Connecticut (2013); M.S., University of Texas at San Antonio (2008); B.S. Math, and B.S. Statistics, University of Texas at San Antonio (2007).


Definite term – reappointment – part-time

YAZDANI, Amin, Research Assistant Professor, Department of Kinesiology, March 1, 2018 – July 31, 2018.

Adjunct appointments

Graduate Supervision and Research

JUUTILAINEN, Sandra, Assistant Professor, School of Public Health and Health Systems, March 1, 2018 – December 31, 2022.

Special appointments

Graduate Instruction

HYNDMAN, Brian, Lecturer, School of Public Health and Health Systems, May 1, 2018 – August 31, 2018.

KACZYSKSKI, Andrew, Lecturer, School of Public Health and Health Systems, May 1, 2018 – August 31, 2018.

Postdoctoral Fellows appointed as research

McDONALD, Alison, Department of Kinesiology, April 1, 2018 – March 31, 2020.

B. SABBATICAL

KELLER, Heather, Professor, Department of Kinesiology, January 1, 2019 – December 31, 2019, 93.3% salary.

C. RETIREMENT

CORBETT, Kitty, Definite Term Professor, School of Public Health and Health Systems, August 31, 2018.
A. ADMINISTRATIVE APPOINTMENTS

DANISCH, Robert, Chair, Department of Drama & Speech Communication, July 1, 2018 to June 30, 2022.

HENDERSON, Heather, Chair, Department of Psychology, July 1, 2019 to June 30, 2023.

LLUIS, Stéphanie, Associate Chair, Graduate Studies, Department of Economics, July 1, 2018 to June 30, 2020.

MARINO, Patricia, Chair, Department of Philosophy, July 1, 2018 to June 30, 2022.

Administrative Reappointments

BUSCH, Lutz-Alexander, Associate Chair, Undergraduate Studies, Department of Economics, July 1, 2018 to June 30, 2020.

JAKOBSH, Doris, Associate Chair, Graduate Studies, Department of Religious Studies, August 1, 2017 to June 30, 2018.

B. LEAVES of ABSENCE

SCOTT, Thomas, Professor, School of Accounting & Finance, April 1, 2018 to March 31, 2019, unpaid leave.
A. APPOINTMENTS

Tenured Appointments

DAUTENHAHN, Kerstin, Professor, Department of Electrical & Computer Engineering (51%) and Systems Design Engineering (49%), August 15, 2018. PhD University of Bielefeld, Germany 1993; MSc University of Bielefeld, Germany 1990. Dr. Dautenhahn will be joining ECE and SYDE to take up the Canada 150 Research Chair in Social Robotics. She brings to us her extensive and widely acclaimed experience in robots that are socially intelligent, targeting important problems such as autism in children.

NEHANIV, Chrystopher, Professor, Department of Systems Design Engineering (67%) and Electrical & Computer Engineering (33%), August 15, 2018. PhD University of California, Berkeley, USA 1992; BSc University of Michigan, Ann Arbor, USA 1987. Professor Chyrstopher Nehaniv has research interests spanning an unusually wide range of disciplines, but which might be summarized as cognition / computational intelligence, which fits well with the interests of the Centre for Theoretical Neuroscience. Professor Nehaniv also has significant interests in systems theory and complex systems, which would be a welcome addition to Systems Design.

Probationary Term Appointments

HAJI REZA, Parsin, Assistant Professor, Department of Systems Design Engineering, April 1, 2018 – June 30, 2021. PhD University of Alberta 2015; MSc University of Alberta 2011; BEng Multimedia University, Malaysia 2012. Dr. Parsin Haji Reza's research focus is on designing and fabricating new medical imaging techniques and modalities including photoacoustic imaging, optical coherence tomography, ultrasound imaging, and applying these novel modalities to the design of medical devices, such as miniaturized endoscopes, as well as nano and optical sensors for biomedical applications.

Probationary Term Reappointments

WEI, Lan, Assistant Professor, Department of Electrical & Computer Engineering, July 1, 2018 – June 30, 2021. PhD Stanford University, Stanford, CA 2010; MS Stanford University, Stanford, CA 2007; BS Peking University, Peking, China 2005.

New Definite Term Reappointments – full-time

AL-HAMMOUD, Rainia, Lecturer, Department of Civil & Environmental Engineering, June 1, 2018 – May 31, 2021.

KWAN, Charles, Lecturer, Department of Mechanical & Mechatronics Engineering, July 1, 2018 – August 31, 2020.

SANGARY, Nagula, Research Associate Professor, Department of Electrical & Computer Engineering, February 1, 2018 – April 30, 2018.
**Visiting Appointments**

GAO, Zhen, Scholar, Department of Electrical & Computer Engineering, March 1, 2018 – February 28, 2019.

YAO, Yao, Scholar, Department of Systems Design Engineering, January 1, 2018 – December 31, 2018.

**Special Appointments – Undergraduate Instruction**

HIASSAT, Abdelhalim, Lecturer, Department of Management Sciences, May 1, 2018 – August 31, 2018.

**Adjunct Appointments – Graduate Supervision and Research**

FANG, Liping, Professor, Department of Systems Design Engineering, September 1, 2017 – August 31, 2020.

**Adjunct Reappointments – Graduate Supervision and Research**

BLASCHKE, Alfred, Associate Professor, Department of Civil & Environmental Engineering, October 31, 2017 – October 31, 2019.

HASSANIZADEH, Majid, Professor, Department of Civil & Environmental Engineering, November 1, 2017 – October 31, 2019.


VANHEEGHE, Philippe, Professor, Department of Civil & Environmental Engineering, December 1, 2017 – November 30, 2019.

**Cross Appointments**

INAL, Kaan, Associate Professor, Department of Mechanical & Mechatronics Engineering to Department of Systems Design Engineering, February 1, 2018 – January 31, 2021.

**B. ADMINISTRATIVE APPOINTMENTS**

CLAUSI, David, Associate Dean, Research and External Partnerships, Department of Systems Design Engineering, May 1, 2018 – April 30, 2021.

KARRAY, Fakhri, Co-Director of the Waterloo Institute for Artificial Intelligence, Department of Electrical & Computer Engineering, March 1, 2018 – February 28, 2021.

**C. SABBATICAL LEAVES**

For Approval by the Board of Governors

ABOUEE MEHRIZI, Hossein, Associate Professor, Department of Management Sciences, May 1, 2018 – April 30, 2019, twelve months at 90.6% salary.

AGNEW, Gordon, Associate Professor, Department of Electrical & Computer Engineering, September 1, 2018 – February 28, 2019, six months at 100% salary.

AL-MAYAH, Adil, Assistant Professor, Department of Civil & Environmental Engineering, July 1, 2018 – December 31, 2018, six months at 85% salary.
COZZARIN, Brian, Associate Professor, Department of Management Sciences, September 1, 2018 – February 28, 2019, six months at 85% salary.

MALHOTRA, Shavin, Associate Professor, Conrad Business, Entrepreneurship and Technology Centre, January 1, 2019 – June 30, 2019, six months at 85% salary.

MIAO, Guo-Xing, Assistant Professor, Department of Electrical & Computer Engineering, September 1, 2018 – February 28, 2019, six months at 100% salary.

MILLER, Daniel, Professor, Department of Electrical & Computer Engineering, September 1, 2018 – August 31, 2019, twelve months at 85% salary.

POLAK, Maria Anna, Professor, Department of Civil & Environmental Engineering, November 1, 2018 – April 30, 2019, six months at 85% salary.

SHEN, Xuemin (Sherman), Professor, Department of Electrical & Computer Engineering, July 1, 2018 – December 31, 2018, six months at 100% salary.

THISTLE, John, Associate Professor, Department of Electrical & Computer Engineering, September 1, 2018 – August 31, 2019, twelve months at 86.4% salary.


Pearl Sullivan
Dean, Faculty of Engineering
FOR INFORMATION

A. APPOINTMENTS

Adjunct Appointments

Graduate Supervision

HALL, Brent, Professor, School of Planning, September 1, 2017 to August 31, 2018.

HAWRELIAK, Jason, Assistant Professor, School of Environment, Resources and Sustainability, December 1, 2017 to December 31, 2020.

SMITH, Sandy, Professor, School of Environment, Resources and Sustainability, September 1, 2017 to December 31, 2020.

ZOLFAGHARI, Kiana, Assistant Professor, Department of Geography and Environmental Management, March 1, 2018 to April 30, 2022.

Cross Appointments

DEAN, Charmaine, Professor, Department of Statistics and Actuarial Science, Faculty of Mathematics to the Department of Geography and Environmental Management, July 1, 2017 to June 30, 2020.

PONNAMBALAM, KumaraSwamy, Professor, Department of Systems Design Engineering, Faculty of Engineering to the School of Environment, Enterprise and Development, April 1, 2018 to March 31, 2020.

SCHWEIZER, Vanessa, Assistant Professor, Department of Knowledge Integration to the School of Environment, Enterprise and Development, April 1, 2018 to March 31, 2022.

B. SABBATICAL LEAVE

For Approval by the Board of Governors

STRACK, Maria, Associate Professor, Department of Geography and Environmental Management, September 1, 2018 to February 28, 2019, at 85% salary.

Jean Andrey
Dean
A. APPOINTMENTS (for approval by the Board of Governors)

Probationary-Term Appointments

MOURSI, Walaa (BSc, 1999; MSc, 2004, both from Mansoura University; PhD, 2016, University of British Columbia), Assistant Professor, Dept. of Combinatorics & Optimization July 1, 2019 June 30, 2022. Dr. Moursi is currently an NSERC postdoctoral fellow at Stanford University. Her research broadly focuses convex and non-convex optimization and analysis, and more specifically on monotone operator splitting methods such as the Douglas-Rachford algorithm. This area is currently particularly active, driven by numerous applications in machine learning and other disciplines. Dr. Moursi integrates with and extends the strengths of the existing continuous optimization group in Combinatorics & Optimization.

SANG, Peijun, (BS, 2010, Zhejiang University; MS, 2014, University of British Columbia; PhD, (exp) 2018, Simon Fraser University), Assistant Professor, Department of Statistics and Actuarial Science, July 1, 2018 – June 30, 2021. Mr. Peijun Sang is currently a PhD student at the Simon Fraser University who expects to complete his degree in May 2018. His research interests include functional data analysis, high dimensional regression, copula modeling and risk analysis. With his research interests and experience with applications, Peijun complements the department’s growing strength in functional data analysis. He will also be able to contribute to the department’s involvement with the Centre for Theoretical Neuroscience.

Definite Term - Reappointments

AKASH, Mukto, Lecturer, Office of the Dean, April 29, 2018 – April 28, 2019.

Adjunct Appointments

Instructor

GIARDINA, Melissa, Lecturer, Office of the Dean, September 1, 2018 – August 30, 2019.

Adjunct Reappointments

Instructor

AKINYEMI, John, Lecturer, David R. Cheriton School of Computer Science, January 1, 2019 – April 30, 2019.

CAMACHO, Fernando, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2018 – August 31, 2018.

GOH, Joslin, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2018 – August 31, 2018.

HACKMAN, Robert, Lecturer, David R. Cheriton School of Computer Science, May 1, 2018 – August 31, 2018.

LANCTOT, Kevin, Lecturer, David R. Cheriton School of Computer Science, January 1, 2019 – April 30, 2019.
LENNOX, Michelle, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2018 – August 31, 2018.

Graduate Students appointed as Part-time Lecturers

Postdoctoral Fellows appointed as Part-time Lecturers


B. ADMINISTRATIVE APPOINTMENTS
McKINNON, David, Chair, Dept. of Pure Mathematics, July 1, 2018 – June 30, 2022.

VASIGA, Troy, Associate Dean, Undergraduate Admissions and Outreach, Office of the Dean, July 1, 2018 – June 30, 2021.

ADMINISTRATIVE REAPPOINTMENTS
GIESBRECHT, Mark, Director, David R. Cheriton School of Computer Science, January 1, 2019 – June 2020.

STEINER, Stefan, Chair, Dept. of Statistics and Actuarial Science, July 1, 2018 – June 30, 2022.

C. SABBATICALS (for approval by the Board of Governors)
LIU, Yu-Ru, Professor, Dept. of Pure Mathematics, September 1, 2018 – February 28, 2019 at 85% salary.

KUO, Wentang, Professor, Dept. of Pure Mathematics, September 1, 2018 – February 28, 2019 at 85% salary.

Stephen M. Watt
Dean
For information:

A. **APPOINTMENTS**

*New Definite Term – Full-Time*

**PHAN, Thai**, Assistant Professor, Department of Earth and Environmental Sciences, March 1, 2018 to February 28, 2021. [B. Eng., Ho Chi Minh City – University of Technology (2004); M. Eng., Asian Institute of Technology (2007); Ph.D., Trent University (2012).] Dr. Thai Phan is an exceptionally talented geochemist and isotope hydrologist who specializes in trace metal cycling in the environment. He has developed novel laboratory techniques for the analysis of metal isotopes using MC-ICP-MS systems similar to the equipment we have in our Environmental Isotope Laboratory. His work is immediately complementary to the work being undertaken by our geochemical/isotope researchers and he brings excellent skills and experience in dealing with deep and shallow subsurface fluids including water-rock interaction phenomena. These are all areas that the Department is actively advancing and developing.

**SFIGAKIS, Francois**, Research Assistant Professor, Department of Chemistry, March 1, 2018 to February 28, 2021. [B.Sc., McGill University (1996); M.Sc., University of British Columbia (1999); Ph.D., University of Cambridge (2006).] This position is fully funded by a research contract (total funding $2.4 million) with Defense Research and Development Canada (DRDC) that runs from 2017 through 2020. The title of the project is “Development of single/entangled photon sources for a quantum radar emitter”. Dr. Sfigakis worked closely to develop the concept, write the proposal and forge the collaboration with colleagues. He will manage the day-to-day operations of the project, including training and co-supervising the HQP involved, and ensure that it remains on schedule.

*Definite Term Reappointment – Full-Time*

**CONANT JR., Brewster**, Lecturer, Department of Earth and Environmental Sciences, September 1, 2018 to August 31, 2019.

*Adjunct Reappointments*

*Graduate Supervision*

**SHOUAKAR-STASH, Orfan**, Assistant Professor, Department of Earth and Environmental Sciences, December 1, 2017 to November 30, 2020.

*Undergraduate Instruction and Research*

**PASETKA, Mark**, Assistant Professor, School of Pharmacy, January 1, 2018 to December 31, 2020.
Graduate Supervision and Research

BRANFIREUN, Brian, Associate Professor, Department of Biology, May 1, 2018 to April 30, 2021.

JIANG, Runqing, Associate Professor, Department of Biology, May 1, 2018 to April 30, 2021.

Undergraduate Instruction, Graduate Supervision and Research

ZHAN, Lixin, Assistant Professor, Department of Physics and Astronomy, January 1, 2018 to August 31, 2023.

Cross Reappointment

GU, Frank, Associate Professor, Department of Chemical Engineering, cross appointed to School of Optometry and Vision Science, February 1, 2018 to January 31, 2021.

B. ADMINISTRATIVE REAPPOINTMENT

MÜLLER, Kirsten, Associate Dean, Graduate Studies, Faculty of Science, September 1, 2018 to August 31, 2021.

FOR APPROVAL BY THE BOARD OF GOVERNORS

C. SABBATICAL LEAVES

DUHAMEL, Jean, Professor, Department of Chemistry, September 1, 2018 to February 28, 2019, 100% salary arrangement.

HAWTHORN, David, Associate Professor, Department of Physics and Astronomy, May 1, 2018 to April 30, 2019, 85% salary arrangement.
Senate Graduate & Research Council met on 12 March 2018 and considered proposals to establish nine new graduate diplomas and one program change. Council agreed to forward the following items to Senate for approval as part of the regular agenda.

Further details are available at: https://uwaterloo.ca/secretariat/committees-and-councils/senate-graduate-research-council

FOR APPROVAL

NEW PROGRAM

Faculty of Applied Health Sciences

1. **Motion:** To approve 6 new Type II graduate diplomas (Epidemiology, Work and Environment, Health Program Evaluation, Health Informatics, Health Promotion, and Global Health) within the School of Public Health and Health Systems (SPHHS), effective 1 September 2018, as presented in Attachment #1.

**Rationale:** The School of Public Health and Health Systems currently offers a wide range of courses to meet its graduate program obligations. Many of these courses are available online, thus providing students with a great deal of flexibility to meet their educational goals. The School believes the diversity of courses can be optimized if students are permitted to bundle specific courses together within their existing degree programs and obtain a recognized sub-specialization when they graduate, by way of these graduate diplomas.

The graduate diplomas will: (1) enhance the marketability of graduates by signifying to employers and other graduate schools that SPHHS students have a particular expertise beyond the broad knowledge expectations of their degrees, (2) expand employment opportunities for students in professional programs, and for students in the MSc program seeking employment outside of academia, by offering a recognized sub-specialty in a public health area, and (3) allow SPHHS to better promote its current courses and attract more high-quality students into its MSc, PhD, and professional programs.

Faculty of Engineering

2. **Motion:** To approve 3 new Type II graduate diplomas (Embedded Systems, Nanoelectronics, Robotics and Control) within the Master of Engineering (MEng) in Electrical and Computer Engineering program, effective 1 May 2018, as presented in Attachment #2.

**Rationale:** The department of Electrical and Computer Engineering (ECE) is looking to expand their MEng program through the addition of 3 new diplomas to the existing diploma list. These optional diplomas will provide additional structure to the MEng program by allowing students to specialize in certain areas of study and receive recognition for that specialization which is highly valued when searching for a job in industry. These diploma options stitch together already existing courses into a comprehensive learning experience for students who wish to not only receive a course-based Masters, but also benefit from a certain level of focus in their course selection.
PROGRAM CHANGE

Faculty of Mathematics

3. Motion: To approve a co-operative education option in the existing Master of Mathematics (MMath) in Applied Mathematics, effective 1 January 2019, as presented in Attachment #3.

Rationale: The department of Applied Mathematics is seeking to add a co-operative education option which would be modelled after the previously approved Master of Mathematics (MMath) in Computational Mathematics – Co-operative Program. There is also an existing co-operative education program in this discipline at the undergraduate level. This proposed co-operative education option would be applied to full-time students pursuing the thesis option, as well as the research paper option associated with the MMath-AM program. The goal is for students to secure employment in an industrial location as soon as possible after at least two terms of coursework or 1/3 of the degree requirements have been completed. The student will also be expected to enroll in a full-time academic term after their work term employment to complete their research paper, thesis and/or remaining coursework.

//kw
Jeff Casello
Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Charmaine Dean
Vice President, University Research
UNIVERSITY OF WATERLOO

GRADUATE EXPEDITED PROPOSAL
OF THE
GRADUATE DIPLOMAS
IN
EPIDEMIOLOGY
WORK AND ENVIRONMENT
HEALTH PROGRAM EVALUATION
HEALTH INFORMATICS
HEALTH PROMOTION
GLOBAL HEALTH

Submitted to the
Ontario Universities Council on Quality Assurance
[date]
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Program Name: Graduate Diplomas in Epidemiology, Work and Environment, Health Program Evaluation, Health Informatics, Health Promotion, and Global Health
Degree Designation: Graduate Diploma

Date of Review: 
Date of appraisal committee Meeting: 
Lead Reviewer: 

1) Objectives

1.1 Overview

The School of Public Health and Health Systems (SPHHS) is currently responsible (fully or jointly) for the following graduate programs:

1. Graduate Research programs;
   a. MSc and PhD in Public Health and Health Systems;
   b. MSc and PhD in Public Health and Health Systems – Water;

2. Graduate Professional programs;
   a. Master of Health Evaluation;
   b. Master of Health Informatics;
   c. Master of Public Health;
   d. Master of Social Work;

3. Collaborative PhD programs;
   a. Aging, Health, and Well-being;
   b. Work and Health; and

4. Graduate Course-based program;
   a. SPHHS is considering the possibility of launching a one-year course-based MSc program that would provide access to the graduate diplomas.

SPHHS currently offers a wide range of courses to meet its graduate program obligations. Many of these courses are available online, thus providing students with a great deal of flexibility to meet their educational goals. The School believes the diversity of courses can be optimized if students are permitted to bundle specific courses together within their existing degree programs and obtain a recognized sub-specialization when they graduate. This recognition will enhance the marketability of graduates by signifying to employers and other graduate schools that SPHHS students have a particular expertise beyond the broad knowledge expectations of their degrees.

Related to the above, the School has identified a particular need to further specify and recognize sub-specialities within its MSc and PhD programs in Public Health and Health Systems. For example, student feedback indicates that individuals considering applications to these programs are unaware they can study epidemiology as part of their degree path. This perception exists despite the range of graduate-level epidemiology courses presently offered in the School. The creation of graduate diplomas will allow SPPHS to better promote its current courses and attract more high-quality students into its MSc, PhD, and professional programs. The diplomas will also expand employment opportunities for students in
professional programs, and for students in the MSc program seeking employment outside of academia, by offering a recognized sub-specialty in a public health area.

The School proposes to launch the following six course-based graduate diplomas (hereafter referred to as ‘diplomas’) in September 2018:

1. Epidemiology;
2. Work and Environment;
3. Health Program Evaluation;
4. Health Informatics;
5. Health Promotion; and

The diplomas will not require the addition of new courses to the curriculum. Current courses will satisfy all diploma requirements. The diplomas will fall under the Type 2 graduate diploma classification as per Appendix 1 of the Quality Assurance Framework (http://www.oucqa.ca/wp-content/uploads/2013/11/Graduate-Diploma-Descriptions-for-the-QAF-Guide.pdf).

The initiative to create the diplomas responds to comments made in the External Review of the School’s academic programs in Spring 2014. The review suggested that the School consider consolidating degrees under more comprehensive degree names, with tracks of concentration.

1.2 Graduate Degree Level Expectations

Since the diplomas will involve existing courses within ongoing graduate programs, the graduate degree level expectations (GDLEs) for the diplomas will match the GDLEs for the graduate programs. Please refer to the appended document entitled ‘Augmented Self Study Report for Academic Program Review – BHP, BSc, MSc and PhD in Health Studies and Gerontology and Master of Public Health (MPH) Volume I – Self Study Report: October 2013’ (hereafter referred to as the ‘Appended Document’) for the Masters GDLEs (Appendix P) and Doctoral GDLEs (Appendix Q).

Similarly, the diplomas will map onto the following existing learning objectives/outcomes for the School’s Masters and Doctoral programs:

1. Focusing on improving the health of the population across the lifespan and on reducing societal inequities affecting the health of various subpopulations;
2. Investigating the complex links between the biological, social, economic, and environmental factors that contribute to health;
3. Utilizing research to formulate solutions to health problems – ranging from the design, implementation, and evaluation of health programs, policies, and services, to the development of assessment and surveillance systems to improve management and accountability of health promotion programs and health or health care systems;
4. Providing MSc students with sufficient knowledge, skills, and research experience to prepare for advancement to the PhD level of graduate work;
5. Providing students in the professional programs with broader skill sets for job prospects and opportunities for training in health research; and
6. Enroling, supporting, and graduating high-quality students to advance population health research and practice.

In addition to meeting the aforementioned five objectives/outcomes, students who complete a diploma will add an interdisciplinary component to their education. For example, students in the Masters of Public Health (MPH) program who take the Graduate Diploma in Work and Environment will have the opportunity to complete courses in workplace health, environmental epidemiology, and toxicology. As another example, students in the research-based MSc or PhD program who take the Graduate Diploma in Health Program Evaluation will be encouraged to enrol in courses on the theory and application of program evaluation, thereby adding an important applied dimension to their research-based education.

A full listing of required diploma courses is shown in Section 4 below. The interdisciplinary component is an essential element of Type 2 graduate diplomas.

1.3 Relationship of the Diplomas to the Mission of the University of Waterloo

The diplomas map onto several of the eight themes listed in the University of Waterloo’s (UWaterloo’s) Strategic Plan 2013-2018, as follows:

1. Experiential learning: Students in the graduate research programs will have an opportunity to obtain practical, applied experience through the courses required in the diplomas;
2. Entrepreneurship: in today’s world, successful entrepreneurs in the health field possess multidisciplinary skill sets and the diplomas will encourage students to branch out and learn skills outside of their ‘home’ disciplines;
3. Transformational Research: successful research initiatives are predicated on multidisciplinary collaborations, which are easier to foster when researchers understand other disciplines through exposure to concentrated groups of courses taken outside of their primary degrees;
4. Outstanding Academic Programming: SPHHS’s unique mix of faculty and graduate degrees is harnessed to provide a new set of academic programs that draw on the expertise of faculty without additional resource implications;
5. Global Prominence and Internationalization: the diplomas will enhance SPHHS’s competitiveness with programs offered by competing and internationally recognized schools through offering unique and specialized training in public health and health systems; the diploma in global health will support the internationalization of SPHHS’s programs.
6. Vibrant Student Experience: the ability to earn recognized diplomas in concentrated fields that match or complement students’ primary foci will help attract top-notch students to UWaterloo;
7. Robust Employer-Employee Relationship: internationally-recognized multidisciplinary programs can help recruit and retain talented faculty; and
8. A Sound Value System: this is already a fundamental part of all public health programs.
1.4 Benefits to the University of Waterloo

The diplomas will:
1. Continue and complement the multidisciplinary and systems approaches adopted by SPHHS’s educational programs;
2. Expand the degree options to include (a) professional training for students enrolled in graduate research programs and (b) research training for students enrolled in graduate professional programs; and
3. Permit the School’s research and professional graduate programs to compete more effectively against other Ontario universities that offer sub-specialties in their health-based research or professional graduate programs.

1.5 Precedence

Similar diploma programs exist at UWaterloo. For example, students pursuing a Master of Engineering degree have the option of choosing from seven possible graduate diplomas to supplement their MEng degree. Three of these seven diplomas are new and scheduled to commence in Winter 2019 (see https://uwaterloo.ca/electrical-computer-engineering/current-graduate-students/courses/graduate-diplomas). As another example, the Department of Philosophy offers two graduate diplomas, one on Theoretical Neuroscience and the other in Cognitive Science (see https://uwaterloo.ca/graduate-studies-academic-calendar/arts/department-philosophy).

2) Admission Requirements

SPHHS plans to launch the diplomas in September 2018. The target audience will be full- or part-time students who will enrol in any of the graduate research or professional degree programs described in Section 1 above. Students already enrolled in one of these programs at launch time will be eligible to receive a diploma provided they apply to SPHHS for diploma recognition and complete all of the required diploma courses prior to graduation. Students seeking a diploma, and who are enrolled in an online professional degree program, will be required to attend campus-based courses in person, when such courses form a part of the diploma’s requirements.

Students who submit an application for admission to UWaterloo for one of SPHHS’s graduate programs will not be required to signify their intent to pursue a diploma at the time of application or admission. Students who meet UWaterloo’s admissions standards for graduate school and who subsequently pursue a graduate research or professional program in SPHHS will be eligible to receive a diploma. Additional factors such as reference letters, research area, supervisor availability, funding availability, lab space, etc. will relate to a prospective student’s graduate school application, not to their interest in pursuing a diploma. As described in the previous paragraph, students will have to apply for diploma recognition and complete all required diploma courses prior to graduation. No separate diploma admission system will exist.
3) Structure

3.1 Academic Policies

The diploma programs will not be stand-alone endeavours. Therefore, no enrolment will occur at the diploma level and students from outside UWaterloo will not be given the option of applying for admittance to ‘diploma programs’. The diplomas will also not be terminal degrees: they will not be awarded to students who successfully complete the required diploma courses, but who do not complete their graduate program requirements.

To receive a diploma, students must obtain an average of 75% or higher in aggregate on the courses chosen to fulfill the diploma requirements. Grades on all individual courses taken to fulfill the diploma requirements must be 70% or higher. A grade below 70% in any course or failing to maintain an average of 75% will necessitate a review of the student's status by the School and may result in a student being required to complete additional coursework or being deemed ineligible to receive the diploma in question.

Unless specified in Section 4 below, transfer credits from courses taken at other universities will not count toward the diploma course requirements. Students who wish to obtain a diploma must take all of the required diploma courses for credit at UWaterloo (save for the exceptions listed in Section 4 below).

Students will be limited to receipt of one diploma for each Masters- or Doctoral-level degree they receive at UWaterloo.

3.2 Governance

The Associate Directors for Graduate Research Programs and Professional Graduate Programs will provide academic direction and guidance for the diplomas. Both Associate Directors are members of the SPHHS Executive Committee.

The Associate Directors report to the Director of SPHHS and will be responsible for:
1. Applying all requisite academic regulations to the diplomas;
2. Serving as the program advisor to all students enrolled in the diplomas;
3. Liaising with SPHHS’s Graduate Research and Professional Graduate Program Committees to ensure the harmonious functioning of the diplomas within SPHHS’ broader educational mandate;
4. Promoting the diplomas to external audiences as a means of recruiting talented graduate students to UWaterloo; and
5. Providing official reports on diploma activities as required.

4) Program Content

Students will be required to take the courses listed below to fulfill diploma requirements. Where courses do not exist in SPHHS, students may fulfill their diploma requirements by taking courses in other departments or faculties within UWaterloo (see non-HLTH courses below).
NOTE: SPHHS is in the process of changing all of its course prefixes to ‘HLTH’. The PHS prefix will be retired effective September 2018. We use the new prefix and numbering system below.

4.1 Epidemiology

HLTH 605 Quantitative methods and analysis*
HLTH 606 Epidemiological methods*
HLTH 705 Advanced statistical methods for analyzing public health and health systems data
HLTH 706 Advanced epidemiological methods

*Students with equivalent graduate-level courses taken outside of UWaterloo may replace HLTH 605 or HLTH 606 (or both) with any of the following courses, provided UWaterloo approves the transfer of credits:
  HLTH 655 Survey research methods
  HLTH 672 Epidemiologic methods in aging research
  HLTH 634 Environmental epidemiology for public health

4.2 Work and Environment

HLTH 604 Public health and environment
HLTH 634 Environmental epidemiology for public health

Plus two of the following:
  HLTH 623 Risk and exposure assessment in public health
  HLTH 624 Environmental toxicology in public health
  HLTH 730 Fundamentals of work and health
  HLTH 731 Approaches to research in work and health
  KIN 620 Ergonomic aspects of occupational musculoskeletal injuries

4.3 Health Program Evaluation†

HLTH 614 Foundations of program evaluation
HLTH 651 Theory and applications in program evaluation
HLTH 653 Program evaluation practice and management

Plus one of the following:
  HLTH 605 or HLTH 656 Quantitative methods and analysis
  AHS 600 Qualitative methods or HLTH 652 Qualitative methods and analysis
  HLTH 654 Systems thinking and analysis in health planning and evaluation
  HLTH 655 Survey methods

†Students enroled in the Master of Health Evaluation program are not eligible to obtain this diploma.

4.4 Health Informatics‡

Page 8 of 16
HLTH 619 Fundamental research methods in health informatics  
HLTH 620 Distributed health informatics or HLTH 620 Information visualization

Plus two of the following:
   CS 634 Security and privacy for health systems  
   CS 792 Data structures and standards in health informatics  
   HLTH 613 Information technology for the health professional  
   HLTH 615 Requirements specification and analysis in health systems  
   HLTH 616 Decision-making and systems thinking in health informatics  
   HLTH 637 Public health informatics

†Students enrolled in the Master of Health Informatics program are not eligible to obtain this diploma.

4.5 Health Promotion

HLTH 603 Health policy in public health  
HLTH 608 Health and risk communication in public health

Plus two of the following:
   HLTH 604 Public health and the environment  
   HLTH 607 Social, cultural and behavioural aspects of public health  
   HLTH 617 Population intervention for disease prevention and health promotion  
   HLTH 624 Environmental toxicology in public health  
   HLTH 638 Selected topics (social justice)  
   HLTH 654 Systems thinking and analysis in health planning and evaluation

4.6 Global Health

HLTH 654 Systems thinking and analysis in health planning and evaluation  
HLTH 662 Global health

Plus two of the following:
   AHS 600 Qualitative methods or HLTH 652 Qualitative methods and analysis  
   HLTH 651 Theory and applications in program evaluation  
   HLTH 632 Health economics and public health  
   Or, with approval of the Associate Director, courses in global health offered through the Balsillie School for International Affairs.

4.7 Appropriateness of Courses for Graduate Diplomas

The courses listed above are appropriate for the diplomas because they cover the core knowledge required of students who wish to gain an understanding of a particular discipline. The courses will (and presently do) include extensive use of readings, lectures, assignments, examinations, and term projects for instructional purposes. Every week students will attend
or watch lectures, depending on the format of the course (classroom-based, blended, or fully online), and contribute to in-class or online discussions.

5) Mode of Delivery

The courses described in Section 4 above are given in class-based, blended (mixed online and seminar delivery), or fully online formats. The class-based courses consist of three weekly hours of lectures, seminars, or student presentations. Blended courses typically consist of weekly or bi-weekly discussion-based seminars of one and one-half to two hours in length. The face-to-face component of these courses replaces the “discussion” part of the fully online courses. Online courses consist entirely of web-based interactions in a distance education format, including live or recorded lectures and real-time or archived discussion boards. SPHHS offers about 40 graduate courses per year; of these about one-half are fully online, and about one-half are in class or blended format. SPHHS encourages instructors to develop flipped or blended learning environments (coupling online delivery with face-to-face seminars) where possible to provide maximum opportunity and access for students.

An instructor leads each course. These individuals are usually full-time faculty members in SPHHS. In circumstances such as sabbaticals, parental leave, etc., the School hires qualified sessional lecturers to teach these courses.

The primary software platform used to facilitate interaction between instructors and students at UWaterloo is called LEARN. LEARN is a web-based course management system that includes features such as document hosting, electronic dropboxes, automated gradebooks, discussion boards, and quizzes. Course instructors may draw upon additional tools such as Maple TA, Adobe Connect, Turnitin, and CrowdMark, as they become available in the LEARN environment.

6) Assessment of Teaching and Learning

6.1 Student Evaluation of Courses

The diplomas will utilize the existing student feedback mechanism employed at UWaterloo. Toward the end of each course, students will be asked to anonymously rate the instructor and course on ten domains:

1. Instructor;
   a. Presentation;
   b. Interest;
   c. Organization;
   d. Attitude;
   e. Availability;
   f. Overall;

2. Course;
   a. Objectivity;
   b. Assigned work;
   c. Workload; and
   d. Overall.
Each domain will be scored on a 5-point scale ranging from 1 (poor) to 5 (excellent). Students will also be able to provide open-ended comments. Students will complete their course evaluations online using UWaterloo’s Evaluate platform.

6.2 Grading of Students

Students will be graded using a variety of methods, including assignments (e.g., problem sets, short essays), term papers, presentations, examinations, and participation in class or online discussions. Instructors possess the flexibility to determine the optimal mix of grading methods for their courses.

7) Resources for All Programs

7.1 Utilization of Existing Human, Physical, and Financial Resources

Applications to the School’s graduate programs may increase because of the diplomas. SPHHS will follow standard practice and adjust recruitment targets, acceptances, and course capitations in response to the numbers of applications received and to the resources available to provide course offerings. The diploma programs will operate, at least initially, under current course capacity ceilings. Therefore, the launch of the diplomas will not be expected to produce additional requirements for staffing, space, or financial resources.

7.2 Faculty Participation in the Diploma Programs

The SPHHS Executive Committee has ensured all diploma courses will be staffed with instructors for the next three years, as per Table 1 below.

Three diploma courses, KIN 620, CS 634, and CS 792 are taught outside of SPHHS. Since these courses are diploma electives, and they may be replaced with other course selections within SPHHS, any unavailability will not affect students’ progress in the diplomas. We will also consider requests to obtain diploma credit for electives taken in other programs, as appropriate.

7.3 Resources to Sustain Graduate Student Scholarship and Research

The diplomas will benefit from the existing infrastructure that supports the School’s graduate programs. The UWaterloo Library currently provides a high level of library support for these graduate programs. Highlights of the Library’s support include:

1. A library collection with strengths in public health disciplines, including research databases, full-text journals, monographs, numeric data, and government publications. Some of the resources of particular interest to public health include MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane Library, Scopus, and Web of Science.

2. The SPHHS Liaison Librarian is available to provide research, teaching and learning support for graduate students and faculty. Instructional support includes the development of online modules and research guides, as well as the preparation of
classroom sessions and outcomes-based workshops. The Liaison Librarian also offers consultations with individuals or research teams to support coursework and study publications.

The UWaterloo Library partners with other Ontario and Canadian universities to further expand access to public health resources. Such collaborations include the Tri-University Group consortium (University of Waterloo, University of Guelph, and Wilfrid Laurier University), the Ontario Council of University Libraries (OCUL) and the Canadian Research Knowledge Network (CRKN).

As the proposed diplomas will not require the addition of new courses to the curriculum, the library resources and services will continue to be able to provide strong support for the research and teaching needs of SPHHS.

UWaterloo graduate students have access to free or highly discounted licensed software, including word processors, spreadsheets, presentation templates, bibliographic management, statistical analysis, drawing, and geographic information systems. The software is available for download through UWaterloo’s Information Systems and Technology webpage. All students are issued a UWaterloo e-mail address and they may access services such as library search engines from off-campus locations through the university’s virtual private network (VPN). SPHHS students may access the powerful SAS v9.4 statistical analysis software free of charge from anywhere in the world through a dedicated server owned and operated by the Faculty of Applied Health Sciences. The faculty also has a dedicated five-person information technology group whose role is to provide graduate students with all forms of software/hardware, e-mail, printing, and VPN support.

Graduate students generally do not utilize shared computer labs to undertake coursework, though SPHHS and AHS do have shared work stations available for use. Many students sit at dedicated computer stations provided by their thesis supervisors or they work remotely using the VPN. On campus, students may access six shared SPHHS desktop computers on a first-come-first-serve basis or occupy the space they have been allocated by their supervisors. All students may send print jobs to laser printers situated on each level of the School’s office suite in Lyle Hallman North. Table 2 below describes the total space allocation for graduate students in SPHHS. Each graduate student receives three net assignable square meters of space.

8) Resources for Graduate Programs Only

8.1 Faculty

The diplomas will be transdisciplinary and therefore require faculty with expertise across a range of disciplines. As described on pages 40-69 of the Appended Document, current SPHHS faculty possess such multidisciplinary expertise. Additionally, all of the faculty listed in Table 2 above are full-time members of SPHHS, with the exception of Drs. Cooke and Dubin, who are jointly appointed to SPHHS (49% allocation to SPHHS in each case).
Since the publication of the Appended Document in October 2013, the School has hired additional faculty, some of whom will teach diploma courses. These additional faculty, not shown in the Appended Document, are listed in Table 3 below.

**Table 1. Diploma Course Staffing: 2017/18 – 2019/20**

<table>
<thead>
<tr>
<th>Course</th>
<th>Instructor 2017/18</th>
<th>Instructor 2018/19</th>
<th>Instructor 2019/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHS 600</td>
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<td>Neiterman</td>
<td>Neiterman</td>
</tr>
<tr>
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<td>Hammond</td>
<td>Hammond</td>
<td>Hammond</td>
</tr>
<tr>
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<td>Laird</td>
<td>Laird</td>
<td>Laird</td>
</tr>
<tr>
<td>HLTH 605</td>
<td>Chaurasia</td>
<td>Chaurasia</td>
<td>Chaurasia</td>
</tr>
<tr>
<td>HLTH 605/656</td>
<td>Dubin/Perlman</td>
<td>Chaurasia/Perlman</td>
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<td>HLTH 606</td>
<td>Ferro/Tyas</td>
<td>Ferro/Tyas</td>
<td>Ferro/Tyas</td>
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<tr>
<td>HLTH 607</td>
<td>Cooke</td>
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<td>Cooke</td>
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<tr>
<td>HLTH 608</td>
<td>Meyer</td>
<td>Meyer</td>
<td>Meyer</td>
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<td>HLTH 613</td>
<td>Chen</td>
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<td>HLTH 614</td>
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<tr>
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<td>HLTH 637</td>
<td>Arocha</td>
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<tr>
<td>HLTH 638 (Social Justice)</td>
<td>Anthony</td>
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Table 2. Graduate Student Space Allocation: School of Public Health and Health Systems

<table>
<thead>
<tr>
<th>COU Code</th>
<th>COU Description</th>
<th>Room Description</th>
<th>Total - NASM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Research Laboratory Space</td>
<td></td>
<td>193.25</td>
</tr>
<tr>
<td>3.2</td>
<td>Laboratory (graduate and faculty) Support Space</td>
<td></td>
<td>10.34</td>
</tr>
<tr>
<td>4.1</td>
<td>Academic Offices</td>
<td>Office Facilities</td>
<td>395.51</td>
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<tr>
<td>4.2</td>
<td>Research Office/Project Space</td>
<td>Laboratory Project Space</td>
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<td>4.3</td>
<td>Graduate Student Offices</td>
<td>Student Office Facilities</td>
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<td>4.4</td>
<td>Departmental Administrative and Support Staff Offices</td>
<td>Office Facilities</td>
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<td>4.5</td>
<td>Office Support Space</td>
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<tr>
<td>11.2</td>
<td>Informal Study Space</td>
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<td><strong>GRAND TOTAL</strong></td>
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</tbody>
</table>

COU: Council of Ontario Universities; NASM: net assignable square meters.

Table 3. Faculty Involved in Teaching Diploma Courses and Hired After October 2013

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Gender (M/F)</th>
<th>Home Unit</th>
<th>Supervisory Privileges</th>
<th>% Time in SPHHS</th>
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</thead>
<tbody>
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<td>Ashok Chaurasia</td>
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<td>M</td>
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<tr>
<td>Craig Janes</td>
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</table>

Note: all faculty in Table 3 are classed as Category 1: tenured or tenure-track core faculty members whose graduate involvement is exclusively in the graduate program under review.
Pending: new faculty under review for Approved Doctoral Dissertation Supervisor (ADDS) status.
SPHHS: School of Public Health and Health Systems.

8.2 Student Financial Assistance

SPHHS graduate students in the research-based programs receive considerable amounts of funding from the School, Faculty of Applied Health Sciences, UWaterloo, supervisors’ research grants, and external awards. The depth and breadth of this funding (Table 4) is sufficient to ensure adequate quality and numbers of students.
Table 4. Graduate Research Student Funding - Spring 2017

<table>
<thead>
<tr>
<th>Type of Funding</th>
<th>Amount ($)</th>
<th># of Awards</th>
<th>Total Amount ($)</th>
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<tbody>
<tr>
<td>DEPARTMENT</td>
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<td>SUB-TOTAL</td>
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<td>$11,667.00</td>
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<td>OTHER AHS/UW AWARDS</td>
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<td>TOTAL</td>
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<td>$665,966.00</td>
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Note: MSc = 73 total students; PhD = 77 total students.
AHS: Faculty of Applied Health Sciences; CIHR: Canadian Institutes of Health Research; NSERC: Natural Sciences and Engineering Research Council of Canada; OGS: Ontario Graduate Scholarship; QEII: Queen Elizabeth II; SSHRC: Social Sciences and Humanities Research Council of Canada; UW: University of Waterloo.

9) Quality and Other Indicators

9.1 Indicators Providing Evidence of Quality of the Faculty

The diplomas will draw upon faculty who are already teaching graduate-level courses. Therefore, these instructors will have met the requisite teaching qualifications for UWaterloo when the diplomas commence. SPHHS’s Annual Performance Review Committee will use existing quality indicators such as teaching load and student evaluations to perform ongoing reviews of faculty teaching. As is current practice, the Committee will recognize excellent instructors through the assignment of above-average scores on the teaching component of their annual performance reviews. Students may recognize excellent instructors by nominating them for an Applied Health Sciences Teaching Award (recent
SPHHS recipients include Drs. Elena Neiterman [2017], Elham Satvat [2016], and Christopher Perlman [2015]). The SPHHS Director will refer faculty to the Centre for Teaching Excellence if any quality indicators suggest room for improvement in teaching performance.

9.2 Ensuring the Intellectual Quality of the Student Experience

SPHHS’s degree programs, courses, and faculty-student interactions already encourage graduate students to develop several key intellectual skills, including:

1. Capacity for critical thinking;
2. Adeptness in creative problem solving;
3. Acquisition of practical working skills through experiential learning;
4. Development of strong research skills; and
5. Accumulation of substantive knowledge about a diverse spectrum of problem areas related to public health and health systems.

The fostering of these skills will continue under the diplomas. In fact, students pursuing diplomas may embark upon fields of study they otherwise would not have chosen, thus enriching their intellectual skill set.

10) Other Evaluation Criteria

In 2016, the SPHHS Executive Committee decided in principle to institute a series of diplomas. The Committee presented this idea to the faculty during a retreat held in October 2016. At the retreat, faculty devised a list of potential diplomas and struck a working group to further develop the idea. After consulting with the School’s Graduate Research and Professional Graduate Programs Committees, faculty, and staff, the working group devised a list of six diplomas that could be mounted based on current course offerings. To describe these diplomas, the working group produced a Statement of Interest that was sent for comment to SPHHS faculty and staff, the Associate Dean-Graduate Studies of Applied Health Sciences, Registrar’s Office, Institutional Analysis and Planning, Quality Assurance Office, Space Planning and Utilization Office, Centre for Teaching Excellence, Centre for Extended Learning, and the Library. The Statement of Interest was sent on an information-only basis to Co-operative Education and Career Action and Marketing and Undergraduate Recruitment. This proposal integrates all feedback on the Statement of Interest.

The proposal was approved on the following dates:

1. School of Public Health and Health Systems: October 26, 2017;
2. Faculty of Applied Health Sciences: November 24, 2017;
3. Senate Graduate and Research Council: forthcoming; and

11) Institutional Approval

Has the proposal received institutional approval through the internal governance process?

Forthcoming
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Applied Health Science

Program: Graduate Diploma (GDip) in Epidemiology

Program contact name(s): Mark Oremus

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program? Choose an item.

New program.

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Fall Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

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<td>• Study option(s)</td>
</tr>
<tr>
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<td>o Coursework</td>
</tr>
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</table>
Proposed Graduate Studies Academic Calendar content:

Admission requirements

- Minimum requirements
  - The Graduate Diploma (GDip) in Epidemiology is offered in conjunction with any of the existing Master’s or Doctoral programs offered by the School of Public Health and Health Systems (SPHHS) or the Master of Social Work (MSW) program.

Degree requirements

Coursework option:

- Courses
  - To receive the GDip in Epidemiology, students must successfully complete the following 4 courses:
    - HLTH 605 Quantitative Methods and Analysis*
    - HLTH 606 Epidemiological Methods*
    - HLTH 705 Advanced Statistical Methods for Analyzing Public Health and Health Systems Data
    - HLTH 706 Advanced Epidemiological Methods
  - *Students with equivalent graduate-level courses taken outside of the University of Waterloo may replace HLTH 605 or HLTH 606 (or both) with any of the following courses, provided the University of Waterloo approves the transfer of credits:
    - HLTH 655 Survey Research Methods
    - HLTH 672 Epidemiologic Methods in Aging Research
    - HLTH 634 Environmental epidemiology for public health
  - Students must obtain an average of 75% or higher in aggregate on the courses chosen to fulfill the GDip requirements. Grades on all individual courses taken to fulfill the GDip requirements must be 70% or higher. A grade below 70% in any course or failing to maintain an average of 75% will necessitate a review of the student's status by the SPHHS and may result in a student being required to complete additional coursework or
How will students currently registered in the program be impacted by these changes?

Not applicable.

Departmental approval date (mm/dd/yy):
Reviewed by GSO (for GSO use only) ☒ date (mm/dd/yy): 11/22/2017
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Applied Health Science

Program: Graduate Diploma (GDip) in Work and Environment

Program contact name(s): Mark Oremus

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program? Choose an item.

New program.

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Fall Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

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</table>
Proposed Graduate Studies Academic Calendar content:

- Coursework

Admission requirements

- Minimum requirements
  - The Graduate Diploma (GDip) in Work and Environment is offered in conjunction with any of the existing Master's or Doctoral programs offered by the School of Public Health and Health Systems (SPHHS) or the Master of Social Work (MSW) program.

Degree requirements

  Coursework option:

  - Courses
    - To receive the GDip in Work and Environment, students must successfully complete the following courses:
      - HLTH 604 Public Health and Environment
      - HLTH 634 Environmental Epidemiology for Public Health
    - Plus 2 of the following courses:
      - HLTH 623 Risk and Exposure Assessment in Public Health
      - HLTH 624 Environmental Toxicology in Public Health
      - HLTH 730 Fundamentals of Work and Health
      - HLTH 731 Approaches to Research in Work and Health
      - KIN 620 Ergonomic Aspects of Occupational Musculoskeletal Injuries
    - Students must obtain an average of 75% or higher in aggregate on the courses chosen to fulfill the GDip requirements. Grades on all individual courses taken to fulfill the GDip requirements must be 70% or higher. A grade below 70% in any course or failing to maintain an average of 75% will necessitate a review of the student's status by the SPHHS and may result in a student being required to complete additional coursework or being deemed ineligible to receive the GDip in question.
    - Students will be limited to receipt of one GDip for each Master's or Doctoral
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<td>o Graduate course search</td>
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How will students currently registered in the program be impacted by these changes?

*Not applicable.*

Departmental approval date (mm/dd/yy):
Reviewed by GSO (for GSO use only) ☒ date (mm/dd/yy): 11/22/2017
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Applied Health Science

Program: Graduate Diploma (GDip) in Health Program Evaluation

Program contact name(s): Mark Oremus

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program? Choose an item.

New program.

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Fall Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

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Program information

- Delivery mode
  - On-campus
- Delivery mode information
  - The program may also be offered online or in a mix of online and on-campus formats.
- Program type
  - Diploma
- Study option(s)
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<td>o To receive the GDip in Health Program</td>
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<td>▪ HLTH 651 Theory and Applications in</td>
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<td>▪ HLTH 654 Systems Thinking and</td>
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<td>Analysis in Health Planning and</td>
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<td>grade below 70% in any course or</td>
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<td>May result in a student being required to complete additional coursework or being deemed ineligible to receive the GDip in question.</td>
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How will students currently registered in the program be impacted by these changes?

_Not applicable._

Departmental approval date (mm/dd/yy):
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Faculty approval date (mm/dd/yy):
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Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Applied Health Science

Program: Graduate Diploma (GDip) in Health Informatics

Program contact name(s): Mark Oremus

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program? Choose an item.

New program.

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Fall Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):
https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

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<tr>
<td>No current content.</td>
<td>Graduate Diploma (GDip) in Health Informatics</td>
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</table>

Program information

- Delivery mode
  - On-campus
- Delivery mode information
  - The program may also be offered online or in a mix of online and on-campus formats.
- Program type
  - Diploma
- Study option(s)
  - Coursework
### Admission requirements

- **Minimum requirements**
  - The Graduate Diploma (GDip) in Health Informatics is offered in conjunction with any of the existing Master's or Doctoral programs offered by the School of Public Health and Health Systems (SPHHS) or the Master of Social Work (MSW) program.
  - **Note**: students enrolled in the Master of Health Informatics (MHI) program are not eligible to obtain the Graduate Diploma (GDip) in Health Informatics.

### Degree requirements

**Coursework option:**

- **Courses**
  - To receive the GDip in Health Informatics, students must successfully complete the following courses:
    - HLTH 619 Fundamental Research Methods in Health Informatics
    - HLTH 620 Distributed Health Informatics or HLTH 620 Information Visualization
  - Plus 2 of the following courses:
    - CS 634 Security and Privacy for Health Systems
    - CS 792 Data Structures and Standards in Health Informatics
    - HLTH 613 Information Technology for the Health Professional
    - HLTH 615 Requirements Specification and Analysis in Health Systems
    - HLTH 616 Decision-Making and Systems Thinking in Health Informatics
    - HLTH 637 Public Health Informatics
  - Students must obtain an average of 75% or higher in aggregate on the courses chosen to fulfill the GDip requirements. Grades on all individual courses taken to fulfill the GDip requirements must be 70% or higher. A grade below 70% in any course or failing to maintain an average of 75% will necessitate a review of the
How will students currently registered in the program be impacted by these changes?

Not applicable.

**Departmental approval date** (mm/dd/yy):
Reviewed by GSO (for GSO use only)  ☒  date (mm/dd/yy): 11/22/2017

**Faculty approval date** (mm/dd/yy):

**Senate Graduate & Research Council (SGRC) approval date** (mm/dd/yy):

**Senate approval date** (mm/dd/yy) (if applicable):
Graduate Studies
Program Revision Template

Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Applied Health Science

Program: Graduate Diploma (GDip) in Health Promotion

Program contact name(s): Mark Oremus

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program?  Choose an item.

New program.

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Fall  Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

Current Graduate Studies Academic Calendar content: No current content.

Proposed Graduate Studies Academic Calendar content: Graduate Diploma (GDip) in Health Promotion

Program information

- Delivery mode
  - On-campus
- Delivery mode information
  - The program may also be offered online or in a mix of online and on-campus formats.
- Program type
  - Diploma
- Study option(s)
  - Coursework
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<td>o The Graduate Diploma (GDip) in Health</td>
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<td>Promotion is offered in conjunction with any</td>
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<td>of the existing Master's or Doctoral programs</td>
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<td>offered by the School of Public Health and</td>
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<td>Health Systems (SPHHS) or the Master of Social</td>
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<tr>
<td>Work (MSW) program.</td>
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<tr>
<td>Degree requirements</td>
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<tr>
<td>Coursework option:</td>
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<tr>
<td>• Courses</td>
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<tr>
<td>o To receive the GDip in Health Promotion,</td>
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<td>students must successfully complete the</td>
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<tr>
<td>following courses:</td>
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<tr>
<td>▪ HLTH 603 Health Policy in Public Health</td>
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<tr>
<td>▪ HLTH 608 Health and Risk Communication in</td>
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<tr>
<td>Public Health</td>
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<td>o Plus 2 of the following courses:</td>
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<tr>
<td>▪ HLTH 604 Public Health and the</td>
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<td>Environment</td>
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<td>▪ HLTH 607 Social, Cultural and Behavioural</td>
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<td>Health Planning and Evaluation</td>
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<td>o Students must obtain an average of 75% or</td>
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<td>higher in aggregate on the courses chosen to</td>
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<td>fulfill the GDip requirements. Grades on all</td>
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<td>individual courses taken to fulfill the GDip</td>
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<td>requirements must be 70% or higher. A grade</td>
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<td>below 70% in any course or failing to maintain</td>
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<td>an average of 75% will necessitate a review of</td>
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<td>the student's status by the SPHHS and may</td>
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<td>result in a student being required to complete</td>
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<td>additional coursework or being deemed ineligible</td>
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<td>to receive the GDip in question.</td>
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<td>-------------------------------------------------</td>
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<td>• Students will be limited to receipt of one GDip for each Master’s or Doctoral level degree they receive at the University of Waterloo.</td>
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<td>• Link(s) to courses</td>
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<td>o <a href="#">Graduate course search</a></td>
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How will students currently registered in the program be impacted by these changes?

*Not applicable.*

Departmental approval date (mm/dd/yy): 
Reviewed by GSO (for GSO use only) ☒ date (mm/dd/yy): 11/22/2017

Faculty approval date (mm/dd/yy):

Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Senate approval date (mm/dd/yy) (if applicable):
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

**Faculty:** Applied Health Science

**Program:** Graduate Diploma (GDip) in Global Health

**Program contact name(s):** Mark Oremus

**Form completed by:**

**Description of proposed changes:**
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

*See attached program proposal.*

**Is this a major modification to the program?** Choose an item.

*New program.*

**Rationale for change(s):**

*See attached program proposal.*

**Proposed effective date:** Term: Fall Year: 2018

**Current Graduate Studies Academic Calendar (GSAC) page** (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-and-health-systems

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**Program information**

- Delivery mode
  - On-campus
- Delivery mode information
  - The program may also be offered online or in a mix of online and on-campus formats.
- Program type
  - Diploma
- Study option(s)
  - Coursework
### Admission requirements

- **Minimum requirements**
  - The Graduate Diploma (GDip) in Global Health is offered in conjunction with any of the existing Master's or Doctoral programs offered by the School of Public Health and Health Systems (SPHHS) or the Master of Social Work (MSW) program.

### Degree requirements

#### Coursework option:

- **Courses**
  - To receive the GDip in Global Health, students must successfully complete the following courses:
    - HLTH 654 Systems Thinking and Analysis in Health Planning and Evaluation
    - HLTH 662 Global Health
  - Plus 2 of the following courses:
    - AHS 600 Qualitative Methods or HLTH 652 Qualitative Methods and Analysis
    - HLTH 651 Theory and Applications in Program Evaluation
    - HLTH 632 Health Economics and Public Health
    - Or, with approval of the Associate Director, courses in global health offered through the Balsillie School of International Affairs
  - Students must obtain an average of 75% or higher in aggregate on the courses chosen to fulfill the GDip requirements. Grades on all individual courses taken to fulfill the GDip requirements must be 70% or higher. A grade below 70% in any course or failing to maintain an average of 75% will necessitate a review of the student's status by the SPHHS and may result in a student being required to complete additional coursework or being deemed ineligible to receive the GDip in question.
  - Students will be limited to receipt of one GDip for each Master's or Doctoral
How will students currently registered in the program be impacted by these changes?

_Not applicable._

**Departmental approval date** (mm/dd/yy):
**Reviewed by GSO** (for GSO use only) ☒ date (mm/dd/yy): 11/22/2017
**Faculty approval date** (mm/dd/yy):
**Senate Graduate & Research Council (SGRC) approval date** (mm/dd/yy):
**Senate approval date** (mm/dd/yy) (if applicable):
UNIVERSITY OF WATERLOO

GRADUATE EXPEDITED PROPOSAL
OF THE

GRADUATE DIPLOMAS
IN
EPIDEMIOLOGY
WORK AND ENVIRONMENT
HEALTH PROGRAM EVALUATION
HEALTH INFORMATICS
HEALTH PROMOTION
GLOBAL HEALTH

Submitted to the
Ontario Universities Council on Quality Assurance

VOLUME II - CURRICULA VITAE OF THE
FACULTY

OCTOBER 2017
# CURRICULA VITAE

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The complete volume II can be found here
MEMO

TO: Alice Raynard
FROM: B. Hellinga, Associate Dean, Graduate Studies
Faculty of Engineering
RE: Engineering Faculty Council Agenda
DATE: March 1, 2018

Please place the following motions forward for approval at the next meeting of SGRC. These motions were approved by EFC on February 27, 2018.

1. The **Department of Electrical and Computer Engineering** would like to submit the following items for approval:

   a) To add “ECE 602 – Introduction to Optimization or CO 602 – Fundamentals of Optimization”, to the list of approved ECE core courses for Communications and Information Systems area of research (OCGS)
   b) To add “ECE 602 – Introduction to Optimization”, to the list of approved ECE core courses for Wireless Communications area of research (OCGS)
   c) To add ECE451, CS445, CS645, SE463, ECE452, CS446, CS646, and SE464 as anti-requisites for ECE 651 – Foundations of Software Engineering

**Rationale for Changes**

Items (a) and (b): ECE 602 provides important foundational knowledge for students in these research areas and as such should be included in the core course list.

Item (c): These courses are part of the core of Software Engineering u/g program and are taken by many u/g students in ECE and CS. As such students completing these programs will already have suitable background in the foundations of software. ECE 651 is intended for students who don’t already have this background.

2. The **Department of Electrical and Computer Engineering** would like to add three new graduate diplomas (Type 2) that would be available to students enrolled in the Master of Engineering (MEng) program.

   a) Graduate Diploma (GDIP) in Embedded Systems
   b) Graduate Diploma (GDIP) in Nanoelectronics
   c) Graduate Diploma (GDIP) in Robotics and Control
Rationale for Changes

The Department of Electrical and Computer Engineering is looking to expand their MEng program through the addition of three new diplomas to the existing diploma list. These diplomas will provide additional structure to the MEng program by allowing students to specialize in certain areas of study. These diploma options stitch together already existing courses into a comprehensive learning experience for students.

Note: In the Nanoelectronics GDip, four of the elective courses are from the new list of NANO core courses (NANO 601C, NANO 601D, NANO 602C, NANO 602D). These courses are expected to be in place for the Spring 2018 term which is also when the GDip is expected to be in place. The Department has opted to use the new course numbers to avoid having to submit another calendar change in the future when the NANO 601 and 602 courses have been formally approved. For clarity, however, the former course numbers for each of the four NANO courses have been included in the calendar listing.

Bruce Hellinga

BH: la
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Engineering

Program: Electrical and Computer Engineering

Program contact name(s): Sarah Landy

Form completed by: Sarah Landy

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

Addition of three new graduate diploma options to the Master of Engineering (MEng) in Electrical and Computer Engineering program.

Is this a major modification to the program?

New Graduate Diplomas.

Rationale for change(s):

The Department of Electrical and Computer Engineering is looking to expand their MEng program through the addition of three new diplomas to the existing diploma list. These diplomas will add structure to the MEng program by allowing students to specialize in certain areas of study and receive recognition for that specialization from the Department which is highly valued when searching for a job in industry. These diploma options stitch together already existing courses into a comprehensive learning experience for students who wish to, not only receive a course based Masters, but also benefit from a certain level of focus in their course selection.

Note: In the Nanoelectronics GDip, four of the elective courses are from the new list of NANO core courses (NANO 601C, NANO 601D, NANO 602C, NANO 602D). These courses are expected to be in place for the Spring 2018 term which is also when the GDip is expected to be in place. The Department has opted to use the new course numbers to avoid having to submit another calendar change in the future when the NANO 601 and 602 courses have been formally approved. For clarity, however, the former course numbers for each of the four NANO courses have been included in the calendar listing.

Proposed effective date: Term: Spring Year: 2018

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/engineering/department-electrical-and-computer-engineering
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<td>Doctor of Philosophy (PhD) in Electrical and Computer Engineering - Nanotechnology</td>
<td>Doctor of Philosophy (PhD) in Electrical and Computer Engineering - Nanotechnology</td>
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<td>Master of Applied Science (MASc) in Electrical and Computer Engineering</td>
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<td>Master of Applied Science (MASc) in Electrical and Computer Engineering - Nanotechnology</td>
<td>Master of Applied Science (MASc) in Electrical and Computer Engineering - Nanotechnology</td>
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<td>Graduate Diploma (GDip) in Electric Power Engineering (direct entry)</td>
<td>Graduate Diploma (GDip) in Electric Power Engineering (direct entry)</td>
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</tbody>
</table>

How will students currently registered in the program be impacted by these changes?

Students who are already in the program will have the option to avail of these diploma options if they so choose.

Departmental approval date (06/14/17):
Reviewed by GSO (for GSO use only) ☒ date (mm/dd/yy): 11/08/2017
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):
GRADUATE DIPLOMA (GDIP) IN EMBEDDED SYSTEMS

The program information below is valid for the spring 2018 term (January 1, 2018 – April 30, 2018).

The Graduate Studies Academic Calendar is updated 3 times per year, at the start of each academic term (January 1, May 1, September 1). Graduate Studies Academic Calendars from previous terms can be found in the archives.

Students are responsible for reviewing the general information and regulations section of the Graduate Studies Academic Calendar.

- Program information
- Admission requirements
- Degree requirements

Program information

- Delivery mode
  - On-campus
- Program type
  - Diploma
- Study option(s)
  - Coursework

Admission requirements

- Minimum requirements
  - The GDip in Embedded Systems is earned in conjunction with the Master of Engineering (MEng) in Electrical and Computer Engineering program.

Degree requirements

Coursework option:

- Courses
  - Students will have an opportunity to be exposed to various aspects essential in understanding, designing and analyzing modern embedded systems. This will include topics related to software, hardware, and their interfacing.
  - To receive the GDip in Embedded Systems, students must successfully complete 3 compulsory courses and 2 elective courses (for a total of 2.50 credits):
    - Compulsory courses (choose 3 of 4):
      - ECE 606 Algorithm Design & Analysis
      - ECE 621 Computer Organization
      - ECE 652 Safety-critical Real-time Software
      - ECE 682 Multivariable Control Systems
    - Elective courses (choose 2 from the following list):
      - ECE 623 Embedded Computer Systems
      - ECE 627 Register-transfer-level Digital Systems
      - ECE 628 Computer Network Security
      - ECE 655 Protocols, Software and Issues in Mobile Systems
      - ECE 657 Computational Intelligence / Intelligent Systems Design
      - ECE 686 Filtering and Control of Stochastic Linear Systems
      - ECE 722 Reconfigurable Computing
      - ECE 751 Distributed and Network-Centric Computing
      - ECE 781 Adaptive control
      - ECE 780-T01 Special Topics in Control: Sampled Data Controlled System
- Note: Electrical and Computer Engineering MEng requirements allow for only 3 courses to be taken outside the Department.

Link(s) to courses
- Electrical and Computer Engineering (ECE) courses
- Graduate course search

Department of Electrical and Computer Engineering website
GRADUATE DIPLOMA (GDIP) IN NANOELECTRONICS

The program information below is valid for the spring 2018 term (January 1, 2018 – April 30, 2018).

The Graduate Studies Academic Calendar is updated 3 times per year, at the start of each academic term (January 1, May 1, September 1). Graduate Studies Academic Calendars from previous terms can be found in the archives.

Students are responsible for reviewing the general information and regulations section of the Graduate Studies Academic Calendar.

- Program information
- Admission requirements
- Degree requirements

Program information

- Delivery mode
  - On-campus
- Program type
  - Diploma
- Study option(s)
  - Coursework

Admission requirements

- Minimum requirements
  - The GDip in Nanoelectronics is earned in conjunction with the Master of Engineering (MEng) in Electrical and Computer Engineering program.

Degree requirements

Coursework option:

- Courses
  - Students will be exposed to a comprehensive spectrum of nanoelectronics, including nano and organic device physics, nanofabrication, nanomaterials, optoelectronics, microscopy and characterizations, nanoelectronic device modeling and biological devices. Mainstream technologies in nanoelectronics industry will be covered in the courses designed for this diploma.
  - To receive the GDip in Nanoelectronics, students must successfully complete 2 compulsory courses and 3 elective courses (for a total of 2.50 credits):
    - Compulsory courses:
      - ECE633 Nanoelectronics
      - ECE635 Fab Nanoscale: Tech & Apps
    - Elective courses (choose 3 from the following list totaling 1.50 credits):
      - ECE634 Organic Electronics (0.50)
      - ECE672 Optoelectronic Devices (0.50)
      - ECE730-T29 Computational Nanoelectronics (0.50)
      - ECE730-T32 Quantum Biology Devices & Apps (0.50)
      - NANO 601C Materials Physics (formerly NANO 701-T13) (0.25)
      - NANO 602C Microscopy (formerly NANO 702-T6) (0.25)
      - NANO 601D From Atoms to Crystals, Quantum Wells, Wires and Dots (formerly NANO 701-T14) (0.25)
      - NANO 602D Thin Film Analysis By X-Ray Scattering (formerly NANO 702-T15) (0.25)
  - Note: Electrical and Computer Engineering MEng requirements allow for only 3 courses to be taken outside the Department.
• Link(s) to courses
  o Electrical and Computer Engineering (ECE) courses
  o Graduate course search

Department of Electrical and Computer Engineering website
GRADUATE DIPLOMA (GDIP) IN ROBOTICS AND CONTROL

The program information below is valid for the **spring 2018 term** (January 1, 2018 – April 30, 2018).

The Graduate Studies Academic Calendar is updated 3 times per year, at the start of each academic term (January 1, May 1, September 1). Graduate Studies Academic Calendars from previous terms can be found in the archives.

Students are responsible for reviewing the **general information and regulations section of the Graduate Studies Academic Calendar**.

- **Program information**
- **Admission requirements**
- **Degree requirements**

**Program information**

- Delivery mode
  - On-campus
- Program type
  - Diploma
- Study option(s)
  - Coursework

**Admission requirements**

- Minimum requirements
  - The GDip in Robotics and Control is earned in conjunction with the Master of Engineering (MEng) in Electrical and Computer Engineering program.

**Degree requirements**

**Coursework option:**

- Courses
  - A robot is an integrated engineering system consisting of electrical and mechanical components, and requiring computation, sensing and control to interact with the physical world. Robots have traditionally been used to perform accurate and repetitive movements to automate industrial production. These days, robots are moving from traditional industrial automation to a wide range of new applications including search and rescue, service, medicine and entertainment. The diploma introduces students to the multidisciplinary subject of robotics, covering design, modelling, control, and motion planning. Diploma students will obtain the foundation for solving algorithmic and control challenges associated with today's robotic applications.
  - To receive the GDip in Robotics and Control students must successfully complete 2 compulsory courses and 3 elective courses (for a total of 2.50 credits):
    - Compulsory courses:
      - ECE682 Multivariable Control Systems
      - ECE606 Algorithm Design & Analysis
    - Elective courses (choose 3 from the following list including at least 1 from those marked with *):
      - *ECE 782 Humanoid Robotics (formerly ECE 780-T06)
      - *ECE 783 Motion Coordination & Planning (formerly ECE 780-T08)
      - *ME 640 Autonomous Mobile Robotics
      - ECE 657 Computational Intelligence / Intelligent Systems Design
      - ECE 686 Filtering and Control of Stochastic Linear Systems
      - ECE 688 Nonlinear systems
- SYDE 652 Dynamics of Multibody Systems
- SYDE 673 Video Processing and Analysis
  - Note: Electrical and Computer Engineering MEng requirements allow for only 3 courses to be taken outside the Department.
- Link(s) to courses
  - [Electrical and Computer Engineering (ECE) courses](#)
  - [Graduate course search](#)

[Department of Electrical and Computer Engineering website](#)
UNIVERSITY OF WATERLOO

GRADUATE EXPEDITED PROPOSAL
OF THE

GRADUATE DIPLOMA (TYPE 2) IN NANOELECTRONICS
GRADUATE DIPLOMA (TYPE 2) IN ROBOTICS AND CONTROL
GRADUATE DIPLOMA (TYPE 2) IN EMBEDDED SYSTEMS

Submitted to the
Ontario Universities Council on Quality Assurance
October 5, 2017

VOLUME I – PROPOSED BRIEF
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10. APPENDIX A: ECE GDIP COURSE SUMMARY ............................................ 8
Program Name: Graduate Diploma in Nanoelectronics  
Graduate Diploma in Robotics and Control  
Graduate Diploma in Embedded Systems

Degree Designation: Graduate Diploma
Date of Review:
Date of appraisal committee Meeting:
Lead Reviewer:

Graduate Diplomas in the Master of Engineering Program – Brief description:
The Master of Engineering (MEng) in Electrical and Computer Engineering is a professional Master’s degree program which currently has four type 2 Graduate Diplomas: Computer Networking and Security, Software Engineering, Sustainable Energy, and Management Science (in collaboration with Management Sciences Department). The Department wishes to add three new type 2 Graduate Diplomas to the existing list;

- Graduate Diploma in Nanoelectronics
- Graduate Diploma in Robotics and Control
- Graduate Diploma in Embedded Systems

As with the existing Graduate Diploma (GDip) structure, these GDips would be optional and earned in conjunction with the regular MEng program in Electrical and Computer Engineering. In order to receive a graduate GDip students must successfully complete all of the degree requirements as outlined in the Graduate Studies Academic Calendar as well as the course requirements for the desired Graduate Diploma. There are no restrictions on the number of Graduate Diplomas a student can be awarded, however, an individual course cannot be applied to more than two credentials (e.g., the degree and a single GDip), and therefore it is unlikely any student would be able to achieve more than 2 GDips over the course of the MEng program. When the GDips are initially launched, students already enrolled in the MEng program who wish to achieve one of the three new GDips may do so provided they have completed the required course work.

Graduate Diplomas in the Master of Engineering Program – Rationale:
The MEng program was created with the purpose of offering a course-based post-graduate degree in Electrical and Computer Engineering to further educate, upgrade, and update the engineering workforce by providing a steady pool of engineers trained at a post-graduate level in advanced fields. To strengthen this vision further, the department has identified three additional key areas of advanced training. These three GDips would complement the existing four GDips to offer more structure to the MEng program as well as offer students an opportunity to specialize in their studies. Furthermore, the option to receive a GDip in conjunction with a professional degree increases the appeal of the MEng Program to both domestic and international students.

Please review the documentation provided by the university and briefly summarize your analysis of the proposal against the relevant evaluation criteria outlined below:
1) Objectives
The MEng program in Electrical and Computer Engineering is specifically designed to cater to the needs of the engineering workforce by offering a course-based professional Engineering graduate degree to further advance their depth of understanding, deepen their knowledge and training in their field of specialization. The Program is also targeted to recently graduated engineers from Universities in Canada and abroad, with an interest in specializing in a specific field before commencing their professional career in industries. Furthermore, the Program provides the new immigrants to Canada (particularly Ontario) with an opportunity to obtain specialized graduate level education in engineering, which would help them enter the Canadian technology sector workforce.

Accordingly, the ECE Department has sought to expand its GDip options to meet the needs of our industry partners, in specific areas of specializations where job opportunities are more, and considering the interest of students in choosing certain fields of study.

2) Admission Requirements
The GDips are awarded from within the Master of Engineering degree program and, as such, students admitted to this program must meet the admission requirements of the Electrical and Computer Engineering Master of Engineering program.

Students normally admitted to a master’s program within the department are required to have completed a four year Honours Bachelor’s degree in a relevant field with a minimum average equivalent to 75%. In exceptional cases where the cumulative average is less than 75 % professional experience and upper year academic performance may be considered.

3) Structure
The MEng is offered as a course-based program in which students must complete a minimum of 8 courses (maximum 10). Five (5) of the student’s courses must be selected from the Department of Electrical and Computer Engineering’s graduate course listing and the remaining 3 (maximum 5) can be taken from other relevant departments’ graduate course listing (typically within the Faculties of Engineering and Math).

Within this framework, students wishing to complete an optional Graduate Diploma must make their course selections from the approved list of courses for the respective GDip option. Each GDip has core courses and electives which must be successfully completed (65% or higher) to qualify for the GDip. Each GDip has sufficient regularly scheduled core and elective courses that a GDip option can be completed within one year (3 terms).

A separate advising/support structure is in place for the MEng program. The MEng Coordinator oversees the program with the support of a full-time staff member. The responsibility of the MEng Coordinator also includes admissions and advising of all MEng students.

4) Program Content
A listing of course descriptions for all Core/Compulsory courses can be found in the Graduate Studies Academic Calendar. There are no restrictions on the number of Graduate Diplomas a student can be awarded, however, an individual course cannot be applied to more than two credentials (e.g., the degree and a single GDip) and therefore it is unlikely any student would be able to achieve more than 2 GDips over the course of the MEng program. Undergraduate courses (including 400 and 500-level courses) will not be recognized towards the
degree/GDip requirements. If a graduate course is cross-listed with an undergraduate course the student must enroll in the graduate course in order to receive credit.

The following is a summary of each new GDip, as written by the developing research group, and the GDip requirements:

i. **Nanoelectronics**

Students will be exposed to a comprehensive spectrum of nanoelectronics, including nano and organic device physics, nanofabrication, nanomaterials, optoelectronics, microscopy and characterizations, nanoelectronic device modeling and biological devices. Mainstream technologies in nanoelectronics industry will be covered in the courses designed for this GDip.

To receive the GDip in Nanoelectronics, students must successfully complete 2 compulsory courses and 3 elective courses (for a total of 2.50 credits):

- **Compulsory courses:**
  - ECE633 - Nanoelectronics
  - ECE635 - Fab Nanoscale: Tech & Apps
- **Elective courses (choose from the following list totaling 1.50 credits):**
  - ECE634 - Organic Electronics (0.50)
  - ECE672 - Optoelectronic Devices (0.50)
  - ECE730-T29 - Computational Nanoelectronics (0.50)
  - ECE730-T32 - Quantum Biology Devices & Apps (0.50)
  - NANO 601C Materials Physics (formerly NANO 701-T13) (0.25)
  - NANO 602C Microscopy (formerly NANO 702-T6) (0.25)
  - NANO 601D From Atoms to Crystals, Quantum Wells, Wires and Dots (Formerly NANO 701-T14) (0.25)
  - NANO 602D Thin Film Analysis By X-Ray Scattering (formerly NANO 702-T15) (0.25)

**Note:** In the Nanoelectronics GDip, four of the elective courses are from the new list of NANO core courses (NANO 601C, NANO 601D, NANO 602C, NANO 602D). These courses are expected to be in place for the Spring 2018 term which is also when the GDip is expected to be in place. The Department has opted to use the new course numbers to avoid having to submit another calendar change in the future when the NANO 601 and 602 courses have been formally approved. For clarity, however, the former course numbers for each of the four NANO courses have been included in the calendar listing.

ii. **Robotics and Control**

A robot is an integrated engineering system consisting of electrical and mechanical components, and requiring computation, sensing and control to interact with the physical world. Robots have traditionally been used to perform accurate and repetitive movements to automate industrial production. These days, robots are moving from traditional industrial automation to a wide range of new applications including search and rescue, service, medicine and entertainment. The Graduate Diploma (GDip) introduces students to the multidisciplinary subject of robotics, covering design, modelling, control, and motion planning. GDip students will obtain the foundation for solving algorithmic and control challenges associated with today's robotic applications.
To receive the GDip in Robotics and Control students must successfully complete 2 compulsory courses and 3 elective courses (for a total of 2.50 credits):

- Compulsory courses:
  - ECE682 - Multivariable Control Systems
  - ECE606 - Algorithm Design & Analysis
- Elective courses (3 total including at least one from those marked with *):
  - *ECE 782 - Humanoid Robotics (formerly ECE 780-T06)
  - *ECE 783 - Motion Coordination & Planning (formerly ECE 780-T08)
  - *ME 640 - Autonomous Mobile Robotics
  - ECE 657 - Computational Intelligence / Intelligent Systems Design
  - ECE 686 - Filtering and Control of Stochastic Linear Systems
  - ECE 688 - Nonlinear systems
  - SYDE 652 - Dynamics of Multibody Systems
  - SYDE 673 - Video Processing and Analysis

iii. Embedded Systems
Students will have an opportunity to be exposed to various aspects essential in understanding, designing and analyzing modern embedded systems. This will include topics related to software, hardware, and their interfacing.

To receive the GDip in Embedded Systems, students must successfully complete 3 compulsory courses and 2 elective courses (for a total of 2.50 credits):

- Compulsory courses (Choose 3 of 4):
  - ECE 606 - Algorithm Design & Analysis
  - ECE 621 - Computer Organization
  - ECE 652 - Safety-critical Real-time Software
  - ECE 682 - Multivariable Control Systems
- Elective courses (choose 2 from the following list):
  - ECE 623 - Embedded Computer Systems
  - ECE 627 - Register-transfer-level Digital Systems
  - ECE 628 - Computer Network Security
  - ECE 655 - Protocols, Software and Issues in Mobile Systems
  - ECE 657 - Computational Intelligence / Intelligent Systems Design
  - ECE 686 - Filtering and Control of Stochastic Linear Systems
  - ECE 722 - Reconfigurable Computing
  - ECE 751 - Distributed and Network-Centric Computing
  - ECE 781 - Adaptive control
  - ECE 780-T01 - Special Topics in Control: Sampled Data Controlled System

5) Mode of Delivery
All courses within each GDip are part of the regular course offerings for all Electrical and Computer Engineering graduate degree programs (with the exception of those offered by other Engineering departments). Most courses have a weight of 0.50 with in-class lectures. In the Graduate Diploma in Nanoelectronics, the NANO courses are weighted at 0.25 and, as such, students will have to complete NANO courses to equal one 0.50 credit. As previously mentioned, each GDip has sufficient regularly scheduled core and elective courses that a GDip option can be completed within one year (3 terms).

6) Assessment of Teaching and Learning
The Master of Engineering is a course-based degree. Students are required to successfully complete at least eight courses with a minimum grade of 65% in each course. Students must maintain an overall average of 70% or above.

The proposed GDips seek to provide a systematic understanding of relevant areas in the field of Electrical and Computer Engineering. They will develop student competence in the field through course content which covers the most current body of knowledge and have students apply critical analysis to emerging theories and questions. Students will build the “intellectual independence required for continued professional development” in their chosen field and “the ability to appreciate the broader implications of applying knowledge to particular contexts.” Students must be able to communicate ideas and conclusions with clarity and have an understanding of how their understanding of the field can be part of a larger picture, accounting for contributions of “other interpretations, methods, and disciplines.”

The GDip in Nanoelectronics will expose students to the comprehensive spectrum of nanoelectronics, allowing them to develop expertise in topics of industry trends including nano and organic device physics, nanofabrication, nanomaterials, optoelectronics, microscopy and characterizations, nanoelectronic device modeling and biological devices.

The GDip in Robotics and Control will prepare students to be experts in the algorithmic and control challenges associated with today’s robotic applications in industries, through exposure to robotic design, modelling, control, and motion planning.

The GDip in Embedded Systems will provide students with an essential understanding of modern embedded systems through design and analysis in computer software, hardware, and other interfacing applications.

Within Electrical and Computer Engineering, all core courses are required to have a final exam worth at least 50% of the final grade, scheduled within the Registrar’s exam period for that term. The assessment of elective courses is left to the discretion of the course instructor but all assessment material must be retained for at least 1 calendar year.

7) Resources for All Programs

The Department of Electrical and Computer Engineering is the largest ECE department in the country. The Department currently has 93 faculty members and mounts over 80 graduate courses each year. Each regularly scheduled ECE course (600 series) has a primary and backup instructor to assure the continued offering of courses regardless of faculty member sabbaticals or absences. Additionally, there are 59 technical and administrative staff members to support students throughout various stages of their programs. There are several undergraduate and graduate labs in the department covering all sub-fields within ECE. In 2016-17 the total research budget for the ECE department was in excess of $19.7M.

8) Resources for Graduate Programs Only

The ECE department has a large, vibrant graduate program. Currently the Department has 663 graduate students enrolled in its various programs; 282 PhD students, 175 MASc students, and 220 MEng Students (including those enrolled in the on-line Electric Power Engineering program). The ECE MEng program has continued to grow with an average 17% increase of applications each year over the last 10 years. More and more students are being attracted to course-based, professional graduate degrees because of their short turnaround time allowing the students to enter the workforce, often in just one year, with a graduate

1 Academic Program Reviews -Graduate Degree Level Expectations, University of Waterloo (https://uwaterloo.ca/academic-program-reviews/program-information/graduate-degree-level-expectations)
degree from a highly regarded University. The ECE graduate program is supported by six full-time administrative staff members, a computer support group, research lab technicians, and four faculty members performing specific duties in the program administration.

9) Quality and Other Indicators
Since 2008, 401 GDips (or certificates pre-2014) have been awarded to 333 ECE MEng graduates.
A full listing of Faculty teaching courses relevant to the MEng Graduate Diplomas can be found in Volume II.

Institutional Approval

Department of Electrical and Computer Engineering Approval: June 2017 and September 2017
Engineering Faculty Council Approval:
University Senate Approval:
Appendix A: ECE GDip Course Summary
<table>
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<tr>
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<td>• ECE 653 Software Testing, Quality Assurance and Maintenance</td>
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<tr>
<td><em>(3 core, 2 elective)</em></td>
<td>• ECE 628 Computer Network Security</td>
<td>• ECE 606 Algorithm Design and Analysis</td>
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<td>• ECE 655 Protocols, Software, Issues in Mobile Systems</td>
<td>• ECE 610 Broadband Communication Networks</td>
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<td>• ECE 628 Computer Network Security</td>
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<td>• ECE 654 Software Reliability Engineering</td>
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<td>• ECE 656 Database Systems</td>
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<td></td>
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<td>• ECE 657 Tools of Intelligent Systems Design</td>
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<td></td>
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<td>• ECE 658 Component Based Software</td>
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<tr>
<td><strong>Software Engineering</strong></td>
<td>• ECE 650 Methods and Tools for Software Engineering</td>
<td>• ECE 606 Algorithm Design and Analysis</td>
</tr>
<tr>
<td><em>(3 core, 2 elective)</em></td>
<td>• ECE 651 Foundations of Software Engineering</td>
<td>• ECE 610 Broadband Communication Networks</td>
</tr>
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<td></td>
<td>• ECE 653 Software Testing, Quality Assurance and Maintenance</td>
<td>• ECE 628 Computer Network Security</td>
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<td>• ECE 654 Software Reliability Engineering</td>
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<td>• ECE 657 Tools of Intelligent Systems Design</td>
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<td></td>
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<td>• ECE 658 Component Based Software</td>
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<td><strong>Sustainable Energy</strong></td>
<td>• ECE 663 Energy Processing</td>
<td>• ECE 632 Photovoltaic Energy Conversion</td>
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<tr>
<td><em>(2 core, 3 elective)</em></td>
<td>• ECE 668 Distribution Systems Engineering</td>
<td>• ECE 661 HVDC and FACTS</td>
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<td>• ECE 662 Power System Analysis and Control</td>
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<td>• ECE 664 Power System Components and Modelling</td>
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<td>• ECE 665 High Voltage Engineering Applications</td>
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<td>• ECE 666 Power System Operation</td>
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<td>• ECE 667 Sustainable Distributed Power Generation</td>
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<td>• ECE 669 Dielectric Materials</td>
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<td>• ECE 768 Power System Quality</td>
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<td><strong>Management Sciences</strong></td>
<td>• ECE 602 Introduction to Optimization</td>
<td>• MSCI 602 Strategic Management Technology</td>
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<td><em>(1 core, 4 elective)</em></td>
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<td>• MSCI 605 Organizational Theory &amp; Behaviour</td>
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<td>• MSCI 607 Applied Economics for Management</td>
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<td>• MSCI 623 Big Data Analytics</td>
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<td></td>
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<td>• MSCI 630 Human Computer Interaction</td>
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<td></td>
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<td>• MSCI 633 Production and Inventory Management</td>
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<td></td>
<td></td>
<td>• MSCI 712 Decision Analysis Under Uncertainty</td>
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<td></td>
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<td>• MSCI 718 Statistical Methods for Data Analytics</td>
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</tbody>
</table>
| Nanoelectronics (**NEW**) (3 core, 2 elective) | ECE 633 Nanoelectronics  
ECE 635 Fab Nanoscale: Tech & Apps |
|---------------------------------------------|-----------------------------------------------|
| Robotics and Control (**NEW**) (3 core, 2 elective) | ECE 606 Algorithm Design & Analysis  
ECE 682 Multivariable Control Systems |
| Embedded Systems (**NEW**) (3 core, 2 elective) | ECE 606 Algorithm Design & Analysis  
ECE 621 Computer Organization  
ECE 652 Safety-critical Real-time Software  
ECE 682 Multivariable Control Systems |
| | ECE634 Organic Electronics  
ECE672 Optoelectronic devices  
ECE730-T29 Computational Nanoelectronics  
ECE730-T32 Quantum biology devices & apps  
NANO701-T13 Materials Physics  
NANO701-T06 Microscopy  
NANO701-T14 From Atoms to Crystals, Quantum wells, wires and dots  
NANO702-T15 Thin film analysis by x-ray scattering |
| | *ECE 782 Humanoid Robotics  
*ECE 783 Motion Coordination & Planning  
*ME 640 Autonomous Mobile Robotics  
ECE 657 Computational Intelligence / Intelligent Systems Design  
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October 5, 2017

VOLUME II - CURRICULA VITAE OF THE FACULTY
# CURRICULA VITAE

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*The complete volume II can be found here*
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Mathematics

Program: Master of Mathematics (MMath) in Applied Mathematics – Co-operative Program

Program contact name(s): Lilia Krivodonova and Cyntia Brățan

Form completed by: Lilia Krivodonova and Cyntia Brățan

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

See attached program proposal.

Is this a major modification to the program? Yes

Rationale for change(s):

See attached program proposal.

Proposed effective date: Term: Winter Year: 2019

Current Graduate Studies Academic Calendar (GSAC) page (include the link to the web page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/mathematics/department-applied-mathematics

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<td>Fields (areas of research)</td>
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<tr>
<td>• Control and Dynamical Systems</td>
<td>• Control and Dynamical Systems</td>
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<tr>
<td>• Fluid Mechanics</td>
<td>• Fluid Mechanics</td>
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<tr>
<td>• Mathematical Medicine and Biology</td>
<td>• Mathematical Medicine and Biology</td>
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<td>• Mathematical Physics</td>
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<tr>
<td>• Scientific Computing</td>
<td>• Scientific Computing</td>
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<tr>
<td>Program information</td>
<td>Program information</td>
</tr>
<tr>
<td>• Admit term(s)</td>
<td></td>
</tr>
<tr>
<td>Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:</td>
<td>Proposed MMath in Applied Mathematics – Co-operative Program Graduate Studies Academic Calendar content:</td>
</tr>
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</tbody>
</table>
| • Delivery mode  
  ○ On-campus | • Admit term(s)  
  ○ Fall  
  ○ Winter  
  ○ Spring |
| • Program type  
  ○ Master's  
  ○ Research | • Delivery mode  
  ○ On-campus |
| • Registration option(s)  
  ○ Full-time  
  ○ Part-time | • Program type  
  ○ Co-operative  
  ○ Master's  
  ○ Research |
| • Study option(s)  
  ○ **Thesis**  
  ○ **Master's Research Paper** | • Registration option(s)  
  ○ Full-time |
| | • Study option(s)  
  ○ **Thesis**  
  ○ **Master's Research Paper** |

**Admission requirements**

- **Minimum requirements**
  - An overall 78% average or its equivalent for undergraduate work.
  - A four-year Honours Bachelor degree with a specialization in Mathematics, or in Science or Engineering with a strong concentration in mathematics.
  - Students who have a strong academic record but who have some gaps in their Applied Mathematics background may be admitted subject to the requirement that they complete a selection of fourth year undergraduate courses as part of their graduate program.

- **Application materials**
  - Résumé
  - Supplementary information form
  - Transcript(s)

- **References**
  - Number of references: 3
  - Type of references: normally from academic sources

- **English language proficiency (ELP) (if applicable)**

**Degree requirements**

The MMath in Applied Mathematics - Co-operative Program will enable students to combine graduate studies with some work experience. The program is normally eight terms long, with six academic terms and two work terms. The timing of work and academic terms is fairly flexible, but the program must start with at least two academic terms and must end on an academic term. Students in the program are encouraged to complete COOP 601 Career Success Strategies in the academic term prior to the first work term.
<table>
<thead>
<tr>
<th>Thesis option:</th>
<th>Thesis option:</th>
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<tbody>
<tr>
<td><strong>Courses</strong></td>
<td><strong>Courses</strong></td>
</tr>
<tr>
<td>- Students must complete 4 one-term (0.50 unit) graduate courses, satisfying a breadth requirement. Candidates for the MMath (thesis) degree must maintain a grade point average of at least 70% in their coursework. Besides the breadth requirement, there are no other constraints on course selection.</td>
<td>- Students must complete 4 one-term (0.50 unit) graduate courses, satisfying a breadth requirement. Candidates for the MMath (thesis) degree must maintain a grade point average of at least 70% in their coursework. Besides the breadth requirement, there are no other constraints on course selection.</td>
</tr>
<tr>
<td>- Breadth requirement: students are required to take 1 Computation course and 1 Differential Equations or Techniques course, from the following list:</td>
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</tr>
<tr>
<td>knowledge of Mathematics and its applications: appropriate courses are often offered by other departments in the Faculties of Mathematics, Science and Engineering.</td>
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</tr>
<tr>
<td><strong>Link(s) to courses</strong>&lt;br&gt;  o Applied Mathematics (AMATH) courses&lt;br&gt;  o Graduate course search</td>
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</tr>
<tr>
<td><strong>Master's Thesis</strong>&lt;br&gt;  o The MMath thesis is a comprehensive study that contributes to the understanding of a research topic, either by relating various approaches in the literature or by developing new methods. An MMath thesis is not required to contain original results. However, it is not uncommon for students - particularly those who have had research experience as undergraduates - to obtain new results that lead to publication in the research literature. For University guidelines on co-authored material in Masters theses please visit the Graduate Studies and Postdoctoral Affairs website; additional departmental guidelines apply.&lt;br&gt;  o The Master's thesis is read by a committee that consists of the thesis supervisor and two other faculty members who are knowledgeable about the research area. The supervisor and at least one of the other two committee members must be affiliated with the Department of Applied Mathematics.&lt;br&gt;  o The student will present their results in a thesis defence, which consists of a 20 minute presentation by the candidate, followed by detailed questioning by the committee members. The thesis should be provided to the examining committee at least two weeks before the defence date.</td>
<td><strong>Graduate Studies Work Report</strong>&lt;br&gt;  o Students are required to complete two four-month or one eight-month work terms, in a suitable position, to begin after at least two academic terms (during which the coursework requirements will typically have been completed). Students will return to campus after the work terms to complete the remaining degree requirements. Students will be required to provide a work term report when they return to campus.</td>
</tr>
<tr>
<td><strong>Other requirements</strong>&lt;br&gt;  o Direct transfer into the PhD program: A Master's student with an excellent record and strong progress in research may apply for direct transfer into the PhD program after one year of Master's</td>
<td><strong>Master's Thesis</strong>&lt;br&gt;  o The MMath thesis is a comprehensive study that contributes to the understanding of a research topic, either by relating various approaches in the literature or by developing new methods. An MMath thesis is not required to contain original results. However, it is not uncommon for students - particularly those who have had research experience as undergraduates - to obtain new results that lead to publication in the research literature. For University guidelines on co-authored material in Masters theses please visit the Graduate Studies and Postdoctoral Affairs website; additional departmental guidelines apply.&lt;br&gt;  o The Master's thesis is read by a committee that consists of the thesis supervisor and two other faculty members who are knowledgeable about the research area. The supervisor and at least one of the other two committee members must be affiliated with the Department of Applied Mathematics.&lt;br&gt;  o The student will present their results in a thesis defence, which consists of a 20 minute presentation by the candidate, followed by detailed questioning by the committee members. The thesis should be provided to the examining committee at least two weeks before the defence date.</td>
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</tbody>
</table>
### Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:

To initiate this process, the student's supervisor must submit a written request to the Graduate Officer. Names of two potential examiners should be included. The request should be accompanied by a statement of research progress to date, written by the student, approximately three pages in length. If the student's record is deemed to be of sufficient standing, the statement of research progress will be forwarded to the examining committee, and the student will be invited to present this summary at a 40 minute presentation followed by questioning by the examining committee. This examination normally takes place in the student's fourth term. If successful, the student is transferred directly into the PhD program and this examination then retroactively takes the place of the pre-comprehensive seminar, which is used by the student's committee to determine the topics for the comprehensive exam; that exam should take place in the student's fifth term.

### Proposed MMath in Applied Mathematics – Co-operative Program Graduate Studies Academic Calendar content:

- The student will present their results in a thesis defence, which consists of a 20 minute presentation by the candidate, followed by detailed questioning by the committee members. The thesis should be provided to the examining committee at least two weeks before the defence date.

### Other requirements

- Direct transfer into the PhD program: A Master's student with an excellent record and strong progress in research may apply for direct transfer into the PhD program after one year of Master's studies. To initiate this process, the student's supervisor must submit a written request to the Graduate Officer. Names of two potential examiners should be included. The request should be accompanied by a statement of research progress to date, written by the student, approximately three pages in length. If the student's record is deemed to be of sufficient standing, the statement of research progress will be forwarded to the examining committee, and the student will be invited to present this summary at a 40 minute presentation followed by questioning by the examining committee. This examination normally takes place in the student's fourth term. If successful, the student is transferred directly into the PhD program and this examination then retroactively takes the place of the pre-comprehensive seminar, which is used by the student's committee to determine the topics for the comprehensive exam; that exam should take place in the student's fifth term.

### Master's Research Paper option:

- **Graduate Academic Integrity Module (Graduate AIM)**

- **Courses**
  
  - Students must complete 7 one-term (0.50 unit) graduate courses, satisfying a breadth requirement. Candidates for the MMath (Research paper) degree must maintain a grade point average of at least 70% in their coursework. Besides the breadth requirement, there are no other constraints on course selection.
  
  - Breadth requirement: students are required to take 1 Computation course and 1 Differential Equations or Techniques course, from the following list:
    - **Computation:**
      - AMATH 740 Numerical Analysis

### Master's Research Paper option:

- **Graduate Academic Integrity Module (Graduate AIM)**

- **Courses**
  
  - Students must complete 7 one-term (0.50 unit) graduate courses, satisfying a breadth requirement. Candidates for
| Current MMath in Applied Mathematics Graduate Studies Academic Calendar content: |
| Proposed MMath in Applied Mathematics – Co-operative Program Graduate Studies Academic Calendar content: |

- AMATH 741 Numerical Solution of Partial Differential Equations
- AMATH 751 Advanced Ordinary Differential Equations
- AMATH 753 Advanced Partial Differential Equations
- AMATH 777 Stochastic Processes in the Physical Sciences

- Techniques:
  - AMATH 731 Applied Functional Analysis
  - AMATH 732 Asymptotic Analysis and Perturbation Theory

  - Students may not count more than three graduate courses that are cross-listed with undergraduate courses for credit towards their MMath (thesis) degree. This restriction applies to all 600-level AMATH courses and any cross listed courses offered by other departments.
  - Courses are selected in consultation with the student's supervisor. Students are encouraged to select courses that will help them develop a broad knowledge of Mathematics and its applications: appropriate courses are often offered by other departments in the Faculties of Mathematics, Science and Engineering.

- Link(s) to courses
  - Applied Mathematics (AMATH) courses
  - Graduate course search

- Master's Research Paper
  - The Master's research paper is a review paper that is typically prepared over the course of one term. It should be 25-35 pages in length. The Master's research paper is assessed by the research supervisor and one other faculty member. There is no oral examination.

  - Students may not count more than three graduate courses that are cross-listed with undergraduate courses for credit towards their MMath (thesis) degree. This restriction applies to all 600-level AMATH courses and any cross listed courses offered by other departments.
  - Courses are selected in consultation with the student's supervisor. Students are encouraged to select courses that will help them develop a broad knowledge of Mathematics and its applications: appropriate courses are often offered by other departments in the Faculties of Mathematics, Science and Engineering.

  - Link(s) to courses

  - the MMath (Research paper) degree must maintain a grade point average of at least 70% in their coursework. Besides the breadth requirement, there are no other constraints on course selection.
  - Breadth requirement: students are required to take 1 Computation course and 1 Differential Equations or Techniques course, from the following list:
    - Computation:
      - AMATH 740 Numerical Analysis
      - AMATH 741 Numerical Solution of Partial Differential Equations
    - Differential Equations:
      - AMATH 751 Advanced Ordinary Differential Equations
      - AMATH 753 Advanced Partial Differential Equations
      - AMATH 777 Stochastic Processes in the Physical Sciences
    - Techniques:
      - AMATH 731 Applied Functional Analysis
      - AMATH 732 Asymptotic Analysis and Perturbation Theory
  - Students may not count more than three graduate courses that are cross-listed with undergraduate courses for credit towards their MMath (thesis) degree. This restriction applies to all 600-level AMATH courses and any cross listed courses offered by other departments.
  - Courses are selected in consultation with the student's supervisor. Students are encouraged to select courses that will help them develop a broad knowledge of Mathematics and its applications: appropriate courses are often offered by other departments in the Faculties of Mathematics, Science and Engineering.
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| | ▪ **Graduate Studies Work Report**
| | o Students are required to complete two four-month or one eight-month work terms, in a suitable position, to begin after at least two academic terms (during which the coursework requirements will typically have been completed). Students will return to campus after the work terms to complete the remaining degree requirements. Students will be required to provide a work term report when they return to campus. |
| | ▪ **Master's Research Paper**
| | o The Master's research paper is a review paper that is typically prepared over the course of one term. It should be 25-35 pages in length. The Master's research paper is assessed by the research supervisor and one other faculty member. There is no oral examination. |

How will students currently registered in the program be impacted by these changes?

*Students that are admitted into the regular MMath in Applied Mathematics program as of Spring 2018 or Fall 2018 will have the option of transferring into the MMath in Applied Mathematics – Co-operative program.*

Departmental approval date (mm/dd/yy): 02/27/18
Reviewed by GSO (for GSO use only) ☒ date (mm/dd/yy): 01/05/2018
Faculty approval date (mm/dd/yy): 02/27/18
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy): 
Senate approval date (mm/dd/yy) (if applicable):
Faculty: Math
Effective term: Term/Year Winter 2019

Course ☐ New ☐ Revision ☐ Inactivation ☐
Milestone ☒ New ☐ Revision ☐ Inactivation ☐

New milestone title: Choose an item. Graduate Studies Work Report

For course revisions, indicate the type(s) of changes:
(*e.g. consent, description, title, requisites*)

Course Subject code: Choose an item. Course number:
Course Title (max. 100 characters incl. spaces):
Course Short Title (max. 30 characters incl. spaces):
Grading Basis: Choose an item.
Course Credit Weight: Choose an item.
Course Consent Required: ☐ Choose an item.
Course Description:
New course description (for revision only):

Meet Type(s): Choose an item. Choose an item. Choose an item. Choose an item.
Primary Meet Type: Choose an item.
Requisites:

Special topics course: Yes ☐ No ☐
Cross-listed: Yes ☐ No ☐

Course Subject(s) to be cross-listed with and approval status:
Sections combined/heldwith:

Rationale for request: See attached program proposal.

The milestone should be applied to the following program:
Master of Mathematics (MMath) in Applied Mathematics – Co-operative Program

Prepared by: Date: Click here to enter a date.
Feasibility Memorandum

L. Krivodonova, *Associate Chair, Graduate Studies, Applied Mathematics*
S. Sivaloganathan, *Chair, Applied Mathematics*

To: C. Lemieux, *Associate Dean, Graduate Studies, Mathematics*
R. Fondacaro, *Director, Student & Faculty Relations, Co-operative Education*
J. Woodside, *Director, Centre for Career Action*

CC: L. Case, *Associate Dean, Co-operative Education, Mathematics*

From: S. Davis, *Faculty Relations Manager, Co-operative Education*
J. Steffler, *Faculty Relations Manager, Co-operative Education*

Date: October 23, 2017

Subject: Feasibility Brief for Addition of Co-op Option to Master of Applied Mathematics Degree Program

1. Introduction

In Spring 2016, the Co-operative Education (CE) department was approached by the Department of Applied Mathematics’ Associate Chair of Graduate Studies to discuss the feasibility of adding a co-operative education (co-op) option to their Master of Mathematics in Applied Mathematics (MMath-AM) degree program. The proposed co-op option would be modelled after the recently approved Master of Mathematics in Computational Mathematics (MMath-CM) Co-operative Program.

After some preliminary discussions in Spring and Fall 2016, a formal feasibility process was started in Fall 2016, based on information provided by the Applied Mathematics program (Appendix A).

Given that:

a) the proposed option would be added to an existing degree program,
b) there is an existing co-op program in this discipline at the undergraduate level,
c) the proposed option would be modelled after the previously approved MMath-CM Co-operative Program; and
d) the number of additional students seeking employment would be small.

CE determined that a full feasibility study was not required. In its place, this abbreviated feasibility study details CE’s perspective on the program as well as any terms and conditions associated with CE’s support for the co-op option moving forward.
2. General Statement on Co-operative Education (CE) Support of Graduate Co-operative Education (Co-op) Programs

Appendix B contains a General Statement on Co-operative Education’s (CE’s) Support of Graduate Co-operative Education (Co-op) Programs, including background information explaining the history of graduate co-op programs at the University of Waterloo, why CE only supports the creation of new ‘co-op’ programs if they meet CAFCE requirements and are supported by CE, and CE’s commitment to working with faculties on supporting other ‘non-co-op’ forms of experiential education.

This statement also highlights recently announced efforts by the Associate Provost, Graduate Studies, to examine co-operative education programming associated with Masters and Post-Doctoral studies, given the growing interest in such programs and the unique needs of students in such programs (when compared to undergraduate students). As these efforts have just begun, there is not enough data currently available to consider potential impacts on the proposed MMath-AM Co-operative program. As such, these efforts are not considered in this abbreviated feasibility study. However, it is important that all parties are aware of the potential impact of these efforts on this program, moving forward.

3. Summary of Changes

The Applied Mathematics department has not yet drafted the proposed graduate studies calendar text for the co-op option. With the expectation that this co-op option will be modelled after the MMath-CM Co-operative program, assumed draft calendar text is presented in Appendix C. This report is based on the assumption that the draft text, and summary of changes outlined in this section, are correct.

The Applied Mathematics department wishes to add the co-op option to one of its existing Master’s programs:

- Master of Mathematics (MMath) in Applied Mathematics

The Applied Mathematics department does not wish to add the co-op option to its other existing Master’s programs at this time:

- Master of Mathematics (MMath) in Applied Mathematics – Quantum Information
- Master of Mathematics (MMath) in Applied Mathematics - Water

The information initially supplied by the Applied Mathematics department (Appendix A), indicated that the co-operative education option would only be applied to students pursuing the thesis option. Subsequent e-mail and in-person conversations, however, clarified that the co-op option would also be applied to the research paper option associated with the MMath-AM program.
Finally, given that the Applied Mathematics program is two years (six academic terms) in length, some modifications to the MMath-CM Co-operative program text were required. These included:

- To be eligible for CAFCE accreditation and the co-op designation, students must complete two work terms. Completing a single work term is not an option.
- Students would undertake their first work term after completing at least two academic terms, or 1/3 of their coursework (not 50%).

3.1. Student Enrollment and Demographics

It is anticipated that 5-8 students would be admitted to the co-op program each year. Accordingly, CE is proceeding under the assumption that no more than 10 students (per year) would be admitted to the co-op option.

International students will be assumed to make up a significant proportion of students enrolled in the program.

3.2. Program Admission

The Applied Mathematics program currently allows students to be admitted in Fall, Winter, or Spring. Theoretically, it would be possible for students to apply for, and be admitted to, the co-op option in any term.

Given the small enrollment in this option, it is assumed that all applications for admission to the co-op option will be submitted in the Fall terms, with actual admission occurring in Winter terms. This will ensure that the department has at least one term’s worth of grades on which to base admission decisions and ensure there are a sufficient numbers of applicants to organize sessions that support the admission process as well as students seeking employment for their first work term.

3.3. Proposed Work/Study Sequence

The goal is for students to secure employment in an industrial location as soon as possible after at least two terms of coursework or 1/3 of the degree requirements have been completed. The student will also be expected to enroll in a full-time academic term after their work term employment to complete their research paper, thesis and/or remaining coursework.

With the above assumptions, this would translate into a number of potential sequences, detailed in Tables 1-3, depending on the student’s term of admission to the MMath-AM program and assuming all admissions to the MMath-AM Co-operative program occur in the Winter term.
Table 1: Co-op Sequences for Fall Admission to the MMath-AM program (S= Study, W= Work Term, * denotes term of admission to co-op program)

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Percentage of Degree on Work Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM1</td>
<td>S1</td>
<td>S2*</td>
<td>W1</td>
<td>W2</td>
<td>S3</td>
<td>S4</td>
<td>S5</td>
<td>S6</td>
<td>25%</td>
</tr>
<tr>
<td>AM2</td>
<td>S1</td>
<td>S2*</td>
<td>S3</td>
<td>W1</td>
<td>W2</td>
<td>S4</td>
<td>S5</td>
<td>S6</td>
<td>25%</td>
</tr>
<tr>
<td>AM3</td>
<td>S1</td>
<td>S2*</td>
<td>S3</td>
<td>S4</td>
<td>W1</td>
<td>W2</td>
<td>S5</td>
<td>S6</td>
<td>25%</td>
</tr>
</tbody>
</table>

Table 2: Co-op Sequences for Winter Admission to the MMath-AM program (S= Study, W= Work Term, * denotes term of admission to co-op program)

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Percentage of Degree on Work Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM4</td>
<td>S1</td>
<td>S2</td>
<td>S3</td>
<td>S4*</td>
<td>W1</td>
<td>W2</td>
<td>S5</td>
<td>S6</td>
</tr>
<tr>
<td>AM5</td>
<td>S1</td>
<td>S2</td>
<td>S3</td>
<td>S4*</td>
<td>S5</td>
<td>W1</td>
<td>W2</td>
<td>S6</td>
</tr>
</tbody>
</table>

Table 3: Co-op Sequences for Spring Admission to the MMath-AM program (S= Study, W= Work Term, * denotes term of admission to co-op program)

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Percentage of Degree on Work Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM6</td>
<td>S1</td>
<td>S2</td>
<td>S3*</td>
<td>W1</td>
<td>W2</td>
<td>S4</td>
<td>S5</td>
</tr>
<tr>
<td>AM7</td>
<td>S1</td>
<td>S2</td>
<td>S3*</td>
<td>S4</td>
<td>W1</td>
<td>W2</td>
<td>S5</td>
</tr>
</tbody>
</table>

NOTE: it is most desirable to have students alternate between periods of work and study, so additional sequences in which students are able to complete a single work term between academic terms are also possible. The above sequences are limited to inclusion of 8-month work terms, based on the Applied Mathematics department’s preference.

The Applied Mathematics department has verified that most student start in the Fall and complete all of their coursework by the end of Winter (first two terms). As such, there are not anticipated to be any issues with respect to access the required courses for their degree, regardless of the term of admission and the sequence they follow. They also indicated that sequence AM2 is likely to be the default sequence.

3.4. Requirements to Remain in the Program

It is assumed (based on the MMath-CM program) that students must maintain an average of at least 70% to remain in ‘good’ academic standing. This requirement is independent of whether or not students are enrolled in the co-op option.

3.5. Limitations on Work Term Requirements

Students will be required to find employment in a ‘suitable industrial location’. There will be no other restriction on the type of employment secured. Therefore, CE assumes there is no expectation that students will need to secure employment directly related to their area of
research. Students will self-select what they believe to be suitable employment for them, based upon the positions that they apply to through the CE-facilitated co-op employment process (i.e., jobs posted in WaterlooWorks for co-op students). Alternatively, students could secure positions on their own, provided that they are approved by CE as meeting the requirements for a co-operative education work term.

4. Co-operative Education (CE) Department Analysis of Proposed Changes

Based on an analysis of the proposed changes, CE supports the proposed option, with some conditions, as outlined in this section. In addition, this section outlines suggestions that may help minimize program administration and improve student success.

It is worth noting that CE is reviewing its support for graduate co-op programs in general and anticipates having additional experiences to draw upon over time. Should the MMath-AM Co-op program be approved and implemented, annual reviews of the program are recommended to determine if there are ways of optimizing the co-op experience for the faculty, department, students, employers, the Centre for Career Action (CCA) and/or CE.

4.1. Work/Study Sequences

The proposed work/study sequences would meet the CAFCE accreditation requirements (for programs under 2 years), for the required percentage of time spent in a work/employment environment. Allowing students to have the option of completing two, 4-month work terms with an academic term in-between, would better align with the traditional model that advocates alternating between work and study. Such a change, however, is not required for CE’s support.

CE recommends stating explicitly in the program description that two work term opportunities are required for the students to complete the co-op option and that the co-op sequence only has two opportunities to secure work. Missing a single work term would render the student ineligible for the co-op designation.

It should be noted that spring terms are the most competitive terms for securing employment. It is recommended, therefore, that students be encouraged to select sequences that avoid spring work terms whenever possible (Note: historical employment data shows that students have the greatest chance of employment success when their first work term is scheduled in a fall term).

4.2. Admission to Co-op

International Students applying to the co-operative education program will benefit from having a work/study sequence option that allows for a first work term two terms beyond their admission to the co-operative program.
There is currently a significant delay in the processing of the permits required for international students to engage in co-op work terms and students cannot apply for these permits until they are accepted into a co-op program of study. CE routinely experiences permit processing times in excess of a standard academic term (e.g., if admission to the co-op option is not made until the Winter term, students may not receive permits in time to start employment in the Spring term). While CE is doing its best to support students in these situations, and processing times may change in the future, ultimately, Waterloo has no control over the permit processing times.

It is recommended that international students be required to select sequences that have their first work terms scheduled 8-months after their admission to the co-op program. This approach will allow for these students to secure their co-op work permits prior to applying for their first term of employment.

4.3. Requirement of Full-time Study

As the program is to follow the template established by the MMath-CM Co-operative program, it is assumed that part-time students are not eligible for the co-op option. This is supported by CE and also aligns with CAFCE requirements.

In order for hiring employers to be eligible for government tax credits and/or incentive programs, students must be enrolled in full-time studies before their scheduled work term and return to (preferably full-time) studies after their work term. None of the accredited co-op programs at Waterloo permit part-time students to participate except under extenuating circumstances.

4.4. Requirements to Remain in the Program

CE has no issues with the assumed requirements to remain in the program, though it is noted that at the undergraduate level, most programs with co-op and non-co-op options require a slightly higher average to remain in the co-op program than the regular option. In the Faculty of Mathematics, this is not necessarily true, as low averages generally result in movement to other plans before there is an impact on eligibility to remain in a co-op program of study.

Without a difference in admission eligibility between the co-op and non-co-op options, it might be difficult to cap the program at the proposed 10 students (i.e., how will the program determine which students are able to take the co-op option if the requirements for the co-op and non-co-op options are the same?). It is recommended that the calendar text state clearly that admission to the co-op option is based on a competitive review of grades and not a specified cut-off to provide the flexibility required to manage enrollment.
4.5. Limitations on Work Term Requirements

MMath-AM Co-op program students will have access to all jobs posted in the WaterlooWorks system (with the exception of jobs posted for Accounting, Architecture, and Pharmacy students).

It is CE’s understanding that the intention behind the co-op option is to provide students with the opportunity to gain practical work experience to complement their academic studies. The requirement that the work experience be in an industrial setting, without additional restrictions, is consistent with the objectives of the option and can be accommodated through the existing employment process.

4.6. Access to WaterlooWorks and Competition for Jobs

It is understood that MMath-AM Co-op program students will be granted full access to WaterlooWorks; as such, they will compete with undergraduate students for employment. Table 4 details the average number of Applied Mathematics undergraduate students seeking employment in recent terms (2014-2016) and the average number of job postings that targeted those students.

Table 4: Applied Mathematics Undergraduate students scheduled out to work, job postings, and employment rates (2014-2016).

<table>
<thead>
<tr>
<th></th>
<th>Fall Cohorts</th>
<th>Winter Cohorts</th>
<th>Spring Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-year Average participation</td>
<td>17</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>3-year Average postings</td>
<td>57</td>
<td>59</td>
<td>56</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>100%</td>
<td>94%</td>
<td>100%</td>
</tr>
<tr>
<td>Average Posted Jobs Per Student</td>
<td>3.31</td>
<td>4.89</td>
<td>3.27</td>
</tr>
</tbody>
</table>

Adding ten MMath-AM students to the pool in any given term would represent a 50% - 100% increase in the number of Applied Mathematics students seeking employment for the term in question. This would increase competition, especially for the senior undergraduate students likely applying for the same positions as MMath-AM students.

The ratio of the number of posted jobs targeted at Applied Mathematics students to the number of Applied Mathematics students scheduled for a work term, was generally greater than 2:1, though only just above this ratio in Fall 2014 (2.24) and Spring 2015 (2.21). As such, the data suggests that the current number of postings could conceivably accommodate the ten additional MMath-AM students. It is important to note, however, that the above data is from the recently retired JobMine system, which allowed employers to target up to five disciplines for each posting. Competition for these jobs may have been greater, as the actual number of students targeted by each position may have been significantly greater than the number of Applied Mathematics students available (e.g., many jobs posted to Applied Mathematics students have also been posted to larger...
programs such as Mechanical Engineering or Computer Science so the job to student ratio may not accurately reflect the degree of competition faced by Applied Mathematics students during their employment search). Equivalent historical data from the new WaterlooWorks system is not yet available.

Having said the above, it is CE’s opinion that significant additional job development for Applied Mathematics MMath students is unwarranted (i.e., it seems likely that the small number of MMath students involved will be served satisfactorily by current job supply). With anticipated variability in the number of students seeking employment in any term, there would also be no guarantee that Applied Mathematics MMath students would be available to apply for the additional jobs developed.

As a result, support of this program will be contingent on a commitment from Applied Mathematics to appropriately set students’ expectations with respect to the degree of competition they may encounter and to provide appropriate guidance on how to search for and secure positions outside the structured campus co-op employment process facilitated by WaterlooWorks (should the students be unsuccessful in competing against their undergraduate and fellow MMath peers).

**4.7. Capacity, Support and Training**

It is unclear whether MMath-AM students admitted to co-op will be able to compete successfully against their intermediate and senior co-op undergraduate counterparts who will have acquired considerable work experience. Despite their enhanced academic qualifications, MMath-AM students are likely to find it challenging to entice employers if they do not possess suitable prior work experience.

MMath-AM co-op students would likely be viewed favourably when compared to first work term undergraduates who possess similar levels of acquired work experience; however, such junior positions are unlikely to meet the expectations of MMath co-op students. In addition, given the challenges associated with securing first-work term employment for undergraduate students in the Faculty of Mathematics, CE would not look favourably on MMath students competing for opportunities targeted at junior Math students. Efforts will need to be taken to help MMath students be more competitive with senior undergraduate students or, as mentioned previously, be provided with appropriate support to secure employment outside of the structured campus co-op employment process facilitated by WaterlooWorks.

CE and the Centre for Career Action (CCA) have developed a robust network of supports for students seeking their first work term, including partnering with the Waterloo Professional Development Program (WatPD) to offer a specialized on-line course (PD 1: Co-op Fundamentals, held with COOP 601: Career Success Strategies) and hiring career advisors specifically trained to help students secure their first work terms. However, both departments acknowledge that the support for first work term co-op students have been
primarily developed with an undergraduate student focus. There will be some unique needs and expectations of graduate students that may not be met by the existing co-op focused supports. However, CCA does have experience and expertise supporting graduate students in achieving their career objectives, including two career advisors dedicated to supporting graduate students. As such, there will be a need to incorporate this existing expertise in working with graduate students, into co-op focused support. This issue was noted in the feasibility study for the MMath- CM – Co-operative program, and the following approach was suggested to address these concerns:

- A mandatory introduction to MMath Co-op workshop (or series of workshops) would be a requirement for students seeking admission to the co-operative program. This workshop (or series of workshops, currently in development), would be facilitated by the Centre for Career Action (CCA) and is anticipated to require approximately 4-5 hours to complete. The workshop would highlight the support available for students, with a focus on the difference needs of graduate and undergraduate students. The session should be held in the Fall term before students submit their applications to the co-op option. This workshop would be open to all MMath-AM students, though attendance at the workshops is considered a requirement before being considered for admission to the co-operative program.

- CCA will work with WatPD to better align the COOP 601 course content with the graduate student experience. The opportunity to interact with the students during the Introduction to MMath Co-op workshop would be invaluable in informing this review, so it is anticipated that any substantive changes to COOP 601 will occur after having the opportunity to receive feedback from a few cohorts of students. MMath-AM Co-op program students would still be encouraged to complete COOP 601 during their recruiting term (the academic term before their first work term), though this would be optional and not a degree requirement.

- The CE department and CCA are exploring the possibility of providing dedicated Career Advisors to support graduate students seeking their first work term. This approach is endorsed by the Director of the Centre for Career Action, subject to resource constraints. Given the work that is currently underway, CE would ask that the Applied Mathematics department adopt the same approach as the Computational Mathematics program, with respect to the above workshop(s). There may be an opportunity for students in both programs to attend the same workshop sessions, allowing for more efficient allocation of resources and allowing MMath students to form a broader peer support network for the employment search.
4.8. Fee Structure

The co-op fee for undergraduate co-op programs at the University of Waterloo is based on an assessment of ‘total costs’ associated with program over the course of their entire degree, with installments paid during academic terms (coordinated with tuition payments). This model acknowledges the total cost of developing and administering co-op for a given program over its duration.

In comparable graduate co-op programs, co-op fees are assessed during the work term upon successful attainment of employment. The same single-term fee is assessed, but the instalments do not recur on subsequent academic terms.

With the proposed Work/Study sequences, MMath-AM Co-op program students would be paying a total of two co-op fees, one for each scheduled work term.

It is notable that under this model, a significant amount of resources would initially be allocated by CE and CCA in offering workshops and other supports that would facilitate both the admission to the co-operative program and employment search. Students ultimately deciding not to seek admission to the program or who do not secure employment, would not pay the co-op fees which support the allocated resources. This will need to be monitored and, if too resources intensive, the approach may need to be revisited in the future.

4.9. Additional Comments

While not specifically related to the CE’s support of the MMath-AM Co-op program, the following additional comments are provided:

- One of the indicators assessed by CAFCE during the accreditation process is whether or not students complete activities that allow for self-reflection and linkage of their work experiences to their academic study and/or overall career goals. Assuming that the work term report requirement for the MMath-CM Co-op program will also be adopted by the Applied Mathematics department, this will likely be viewed favourably in the accreditation process. Should a work term report not be required, there will need to be discussion about how this accreditation requirement will be met.

- Undergraduate co-op students in the Faculty of Mathematics are required to take a series of professional development (PD courses) during their scheduled work terms. These courses are administered by the WatPD program and cover topics that would benefit students enrolled in a graduate co-op program. The Director of the Computational Mathematics consulted with the WatPD program in 2016 and determined that graduate student enrollment in these courses was not possible at that time. In the event graduate student enrollment in these courses can be accommodated, it would be worth adding PD courses as a requirement in the MMath-AM co-op option.
In the past, some graduate co-op options have made reference to co-op ‘placement’; this terminology also exists in the approved calendar text for the MMath-CM Co-op program. CE feels that use of the term ‘placement’ understates the amount of student engagement required for an effective employment search. Placement implies a process through which the institution actively matches students with employers such that matches are guaranteed instead of reflecting the intense work and competition in which Waterloo co-op students must engage to secure their employment. Therefore, it is recommended that ‘co-op employment’, ‘employment opportunity’, or similar language, be used in place of ‘co-op placement’. The draft text presented in Appendix C is consistent with this recommendation.

5. Support and Recommendations

CE is supportive of the creation of the Master of Mathematics (MMath) in Applied Mathematics – Co-operative Program, modelled after the approved Master of Mathematics (MMath) in Computational Mathematics – Co-operative Program. Similar to the MMath-CM Co-op program, approval is contingent on the following:

1. The draft calendar text proposed in Appendix C accurately reflects the text that will be brought forward for approval.
2. There is no expectation that the Co-operative Education department will develop additional jobs specifically targeted for MMath-AM co-op students.
3. Combined enrollment in the MMath-AM Co-operative Program will not exceed ten students in any given year.
4. An Introduction to MMath Co-op workshop, or series of workshops, will be facilitated by Co-operative Education and/or Centre for Career Action staff each Fall term. Graduate students intending to apply to the co-op option would be required to attend this session.
5. While students can enter the MMath-AM program during any term, it is anticipated that entry into the co-op will only occur in winter terms, with applications made in the preceding fall term.
6. International students accepted to the MMath-AM Co-op program will not be permitted to schedule their first work term any earlier than two academic terms after they have been admitted to the option.
7. The Applied Mathematics department will assist in setting appropriate expectations for students interested in pursuing the co-op option, including the realities of competition with experienced undergraduate students and the lack of guaranteed links to the students’ specific research interests.

In addition, CE recommends that consideration be given to the following:
1. International students would benefit from direct admission to a co-op option should such an admission category become available in the future. Alternatively, consideration should be given to looking at ‘conditional admission’ in the Fall term. Both of these options would help address the timing of securing co-op work permits for international students.

2. The term ‘placement’ be avoided whenever referring to co-op employment or the co-op employment process.

Finally, as part of its commitment to the MMath-AM Co-op option, CE and CCA will:

1. Review and update the content of COOP 601 to better reflect graduate student needs and experience. This review will occur after engaging with the first several cohorts of MMath-AM and MMath-CM students.

2. Review how best to arrange for a dedicated point of contact to provide career guidance and co-op process support for graduate students that accounts for the differences between the undergraduate and graduate experience.

L. Krivodonova, Associate Chair, Graduate Studies, Applied Mathematics | Faculty of Mathematics

Sivabal Sivaloganathan, Chair
Applied Mathematics | Faculty of Mathematics

Christiane Lemieux, Associate Dean, Graduate Studies
Faculty of Mathematics

Jeremy Steffler, Faculty Relations Manager
Student and Faculty Relations | Co-operative Education

Rocco Fondacaro, Director
Student and Faculty Relations | Co-operative Education

Jennifer Woodside, Director
Centre for Career Action

Date
Appendix A: AMATH Response to CECA Feasibility Study Checklist

Basic Program/Plan Information

What is the name of the new program/plan?
(no change) MMath Applied Mathematics

What is the proposed emphasis for the new program? Please include basic program information and descriptions (i.e., text similar to what would appear in the Calendar, including the list of courses).
(no change) The MMath thesis is a comprehensive study that contributes to the understanding of a research topic. Master's thesis results sometimes lead to publication in the research literature. The Master's thesis is assessed by a committee composed of the thesis supervisor and two other faculty members, after which a thesis defence is held. The defence consists of a 20 minute presentation by the candidate, followed by detailed questioning by the examining committee.

Is this a new program/plan?
- If no, what program/plan is being changed?

No. A co-op option is proposed.

What is the suggested start date of the new program/plan?

Fall 2018

What is the proposed academic/work term study sequence for the new program/plan?

Any of:
Study Study Work Work Study Study Study
Study Study Study Work Work Study Study Study
Study Study Study Study Work Work Study Study

Who are the primary/secondary Faculty contacts for the new program/plan?

Brian Ingalls, Graduate Officer, Applied Mathematics
Siv Sivaloganathan, Chair, Applied Mathematics
What are the requirements for admission into the program/plan (e.g., grades, special courses, certain academic level, etc.)?

(no change) https://uwaterloo.ca/graduate-studies-academic-calendar/mathematics/department-applied-mathematics/master-mathematics-mmath-applied-mathematics#admission_requirements

What is the enrolment target for this particular program; will enrolment increase or not change at all; what will be the net effect and nature of the change; etc.?

5-8 per year (30-50% of the current yearly enrollment in the Master’s program).
Enrolment will not change at all, unless after three years we notice a significant increase in demand for this Co-op MMath.

What are the dimensions of the societal need for students/graduates (e.g., socio-cultural, economic, scientific, technological, etc.)?

The internet revolution has changed the face of industry in all areas (including economic, scientific and technological sectors) and created a demand for appropriately trained graduates in the Mathematical Sciences. Graduates from this Co-op MMath would be able to fill new technical roles in scientific and technological areas.

What is the geographic scope of the societal need (e.g., local, regional, provincial, national)?

National and Global

Job Development Needs

Would students in any existing Waterloo co-op programs/plans be seeking employment in similar areas as students in the proposed program/plan?
- If yes, what are the names of the programs/plans?

Yes. Mathematics, Physics, Engineering

If there are existing co-op programs/plans that may have students competing for employment positions, what jobs (at the Junior, Intermediate, and Senior levels) would be most appropriate for students in the new program?

Intermediate and senior level positions appropriate to the programs listed above.
Industry Analysis

In what industry sectors does the Faculty expect graduates from the program/plan to be employed in?

Tech sector (software), engineering, quantitative research (science, engineering, medicine)

Are there similar programs/plans to the proposed program/plan offered at other institutions in Ontario, Canada, and/or Internationally? If yes, which programs are anticipated to represent the most competition for the proposed program/plan, and why?

Engineering programs, math programs, physics programs. Not clear which would represent the most competition.

Program Marketing and Job Development (Employer Value Proposition)

What is Applied Mathematics?

Applied Mathematics is the application of mathematical tools to solve problems in science and the applied sciences (engineering, medicine, economics). The program’s focus is on the development and analysis of predictive mathematical models of complex systems.

Where will students in the new proposed program/plan work?

Software and engineering firms. Government and industry research groups. Technical consultants. Health sector (eg Pharmaceutical companies, biomedical consulting companies, research etc)

What academic qualifications and preparation is possessed by students in the first year of the proposed program/plan?

Expertise in the development and analysis of predictive mathematical models of complex systems. Some domain-specific expertise in an area of pure or applied science (engineering, medicine). Computational skills and the ability to effectively use widely available scientific software.

What academic qualifications and preparation is possessed by students graduating from the proposed program/plan?
In addition to the above, experience in the design and execution of a significant research project, including preparation of a significant research report (thesis) and presentation of research in a thesis defense.

**How would employers benefit from hiring students in the proposed program/plan?**

Compared to the pool of undergraduates, access to students engaged in significant mathematical research projects in domain specific application areas.

**If the proposed program/plan is being jointly sponsored by multiple academic units or is closely related to existing program/plans, what is the relationship between the proposed program/plan and each related program plan?**

Related to undergrad programs in Math, Engineering and Physics, and the new Co-op MMath in Computational Math. In comparison to the other math programs, the proposed program involves a stronger focus on domain-specific applications in science and applied science. Compared to programs in Engineering or Physics, there is a stronger focus on mathematical techniques.

**For each program/plan in which existing Waterloo co-op programs/plans would be seeking employment in similar areas as students in the proposed program/plan (as identified in the Job Development Needs section):**

- What job titles/functions would junior students in the proposed program/plan fill and how specifically would students in the proposed program/plan contribute to these roles?
- What job titles/functions would senior students or new graduates in the proposed program/plan fill and how specifically would students in the proposed program/plan contribute to these roles?

There’s little distinction between junior and senior students. They will be able to contribute in terms of technical skills (computing, analysis).

**What similar programs/plans to the proposed program/plan offered at other institutions in Ontario, Canada, and/or Internationally and what differentiates graduates from the proposed program/plan from these existing programs/plans?**

There are many similar programs.
Appendix B: General Statement on Co-operative Education (CE) Department’s Support of Graduate Co-operative Education (Co-op) Programs

It is noted that the Faculty of Mathematics (and other faculties on-campus) have existing graduate co-operative education (co-op) options that are not supported by the Co-operative Education (CE) department. These co-op options were initially created to provide an employment opportunity for students participating in thesis research, sponsored by industrial partners. It was not uncommon for these students to spend a term off-campus, working with their research partner on their thesis project. Co-op options provided these students the opportunity to receive credit for work performed while the student was not enrolled in academic study.

Graduate co-op programs initially limited employers of graduate students to the sponsors of their research and there was no need for the students to access the job development, interview, and work term support services provided by (what is now) CE and other departments within the Office of the Associate Provost, Co-operative and Experiential Education. Based on the initial premise of graduate co-op options, it is not surprising that the processes and procedures supporting graduate co-op programs have evolved separately from the processes currently supporting undergraduate students.

Since co-op options for graduate students were implemented there have been many changes to the co-operative education framework at Waterloo:

- The Canadian Association for Co-operative Education (CAFCE) was founded (with Waterloo as a founding member), established accreditation criteria for co-op programs, and now formally accredits co-op programs in Canada. (Note: while Waterloo has made a commitment to accredit all its co-op programs, many ‘grandfathered’ graduate co-op programs are not CAFCE accredited).
- Graduate degree programs have diversified to include non-thesis options. Students in these programs do not have established industrial partners to employ them during their work terms; hence, must often secure co-op employment independently.
- Co-operative education has become an integral component of Waterloo’s strategic mandate and grown substantially. CE now partners with over 6,300 organizations to support over 20,000 work terms annually.
- In recent years, all new co-op graduate programs and options are supported by CE and have been designed to allow for accreditation through CAFCE.

The term ‘co-operative education’ can now refer to programs with differing policies, procedures and expectations for student and employer stakeholders. It is not surprising that the current situation creates confusion amongst our valued stakeholders. For example, some graduate students who opt to study at Waterloo based on our reputation in ‘co-op’ become
frustrated when they are not able to access the co-op employment supports offered by CE and highlighted in our institution’s promotional materials. In addition, some employers become frustrated by the different hiring processes, expectations, and differing supports in place for undergraduate and graduate students.

Given the anticipated growth in graduate co-op student enrollment and the potential for increased co-op brand confusion, CE does not support the creation of co-op options or programs at the graduate level that are administered by the department. If it is desirable to create a program that is not supported by CE, it is recommended that the program or option be labelled and marketed as a form of work-integrated learning other than ‘co-operative education’ (e.g., service learning, practicum, internship, etc.) to minimize brand confusion and make it clear to all stakeholders that the program in question does not follow the co-op model.

Note: CE is willing to partner with faculties and support any model of work-integrated learning - not just co-op. CE’s involvement can allow faculties to tie into existing expertise and resources for their students, while developing processes and procedures that are more aligned with their degree objectives than the co-op model may currently allow. CE benefits from these interactions by being able to act as a central point of contact for employers, ensuring that they are informed about the differences between the various work-integrated learning programs at Waterloo, and being able to manage the co-operative education and experiential learning brands.

Finally, please be advised that the Associate Provost, Graduate Studies is currently reviewing the pedagogy and implementation of co-operative education at the graduate studies level. New model(s) of co-operative education and work-integrated learning may be on the horizon for graduate programs. As this work is on-going, it is not known how or when it will impact current and proposed graduate co-op programs nor will it affect feasibility studies already underway.
Appendix C: Draft Calendar Text

The following is a draft of the assumed calendar text that would be revised or added to the following program:

- Master of Mathematics (MMath) in Applied Mathematics

To create the following new program entry in the Graduate Studies Calendar.

- Master of Mathematics (MMath) in Applied Mathematics - Co-operative Program

Only changes or additions are presented.
Master of Mathematics (MMath) in Applied Mathematics - Co-operative Program

The program information below is valid for the Winter 2019 term (January 1, 2019 - April 30, 2019).

Program information

- Registration option(s)
  - Full-time (Note: The co-operative education program is not available to part-time students)

Degree requirements

- Thesis option:
  - Graduate Studies Work Report and Work Term Experiences
    - In Applied Mathematics, a master’s option may be undertaken on a co-operative basis, enabling a student to combine graduate studies with some work experience. The program is normally eight terms long, with six academic terms and two work terms. The timing of work and academic terms is fairly flexible, but the program must start with at least two academic terms and must end on an academic term. Students in the program are encouraged to complete COOP 601 Career Success Strategies in the academic term prior to the first work term. Admission to the co-op program is competitive. Students should apply for this option after completing at least one academic term. Admittance will be decided based on the student’s progress to date, and is subject to approval by the student's research supervisor.
      - Students are required to complete two four-month or one eight-month work term, in a suitable position, to begin after at least two academic terms (during which the coursework degree requirements will typically have been completed). Students will return to campus after the work terms to complete the remaining degree requirements. Each student will be required to provide a work term report when they return to campus.

- Master's Research Paper option:
  - Graduate Studies Work Report and Work Term Experiences
    - In Applied Mathematics, a master’s option may be undertaken on a co-operative basis, enabling a student to combine graduate studies with some work experience. The timing of work and academic terms is fairly flexible, but the program must start with at least two academic terms and must end on an academic term. Students in the program are encouraged to complete COOP 601 Career Success Strategies in the
academic term prior to the first work term. Admission to the co-op program is competitive. Students should apply for this option after completing at least one academic term. Admittance will be decided based on the student’s progress to date, and is subject to approval by the student’s research supervisor.

- Students are required to complete two 4-month or one 8-month work term, in a suitable position, to begin after at least two academic terms (during which the coursework degree requirements will typically have been completed). Students will return to campus after the work terms to complete the remaining degree requirements. Each student will be required to provide a work term report when they return to campus.
Senate Undergraduate Council met on 13 March 2018 and agreed to forward the following items to Senate for approval. Council recommends these items be included in the regular agenda.

Further details are available: [https://uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council](https://uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council)

**FOR APPROVAL**

**CHANGES TO ACADEMIC PLANS**

**Faculty of Applied Health Sciences**

Articulation Agreement

1. **Motion:** That Senate approve the proposed admission, progression and transfer credit requirements for the Honours Recreation and Leisure Studies plan as outlined in the attached articulation agreement with Mohawk College (“Mohawk”), effective 1 September 2019.

   **Background and Rationale:** This agreement replaces a previous agreement with Mohawk. The agreement allows eligible graduates of the two-year Recreation Therapy diploma at Mohawk to apply to the Honours Recreation and Leisure Studies plan at Waterloo on the terms of Attachment #1.

**Faculty of Arts**

Women’s Studies

2. **Motion:** That Senate approve changes to the name, intended learning outcomes and curriculum for the Women’s Studies program and all plans which form a part thereof as outlined in Attachment #2, effective 1 September 2019.

   **Background and Rationale:** Following the Women’s Studies program review in 2014, the then-Women’s Studies Board held a retreat facilitated by an educational developer. At the retreat, the Board developed new learning outcomes, a revised mission statement and a proposed new name, “Gender and Social Justice.” After the retreat, the then-program director led a process to revise the courses and curriculum in alignment with the new mission and learning outcomes, and a process to consult with campus stakeholders on the proposed new name and mission statement. The results of consultation weighed significantly in favour of the proposed changes. The name change, in particular, is aligned with trends across higher education in North America and feedback received from prospective, current and graduated students. Please see the attached for more details on the proposed changes, rationale therefor and results of consultation.

**INACTIVATION OF ACADEMIC PLANS**

**Faculty of Science**

Honours Chemistry (Materials Chemistry Specialization)

Honours Co-operative Chemistry (Materials Chemistry Specialization)

3. **Motion:** That Senate approve the inactivation of Honours Chemistry (Materials Chemistry Specialization) and Honours Co-operative Chemistry (Materials Chemistry Specialization), effective 1 September 2019.

Rationale for the proposed inactivations: There has been very little interest from students in the materials chemistry specialization.

Faculty of Science
Honours Science and Business – Chemistry Specialization (Reg and Co-op)
Honours Co-operative Science and Business – Earth Sciences Specialization (Co-op only)
Honours Science and Business – Environmental Science Specialization (Reg and Co-op)
Honours Co-operative Science and Business – Physics Specialization (Reg and Co-op)

4. Motion: That Senate approve the inactivation of Honours Science and Business – Chemistry Specialization (Reg and Co-op), Honours Co-operative Science and Business – Earth Sciences Specialization (Co-op Only), Honours Science and Business – Environmental Science Specialization (Reg and Co-op) and Honours Co-operative Science and Business – Physics Specialization (Reg and Co-op), effective 1 September 2019.

Background and Rationale: The current descriptions of the plans can be found at:
http://ugradcalendar.uwaterloo.ca/page/SCI-HCO-Science-and-Business-or-Physics1

The primary reasons for the proposal to inactivate the plans are:

- There are very few students enrolled in these specializations.
- Students normally transfer out of these specializations after completing their first term in the Science and Business program.
- Additional scheduling constraints are required for very few students.

The regular version of the Earth Science Specialization remains a popular program for Science joint undergraduate programs with university partners in China. Therefore, it will remain active.

Students currently in these specializations will be allowed to continue in them and to graduate from them. Students entering studies in 2019 will no longer have the option to pursue these specializations within the Science and Business program.

Mario Coniglio
Associate Vice-President, Academic
Articulated Admission and Transfer Credit Agreement

between

University of Waterloo
Faculty of Applied Health Sciences
Waterloo, Ontario, Canada

and

Mohawk College
Community and Urban Studies
Hamilton, Ontario, Canada

WHEREAS, University of Waterloo and Mohawk College have developed this transfer credit agreement (the “Agreement”) with the purpose of facilitating the educational mobility and transfer of students from Mohawk College to University of Waterloo.

WHEREAS, University of Waterloo and Mohawk College enter into this Agreement as cooperating, equal partners who shall maintain the integrity of their separate programs while working to ensure a smooth curriculum transition for interested and qualified students.

NOW THEREFORE in consideration of the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficient of which is hereby acknowledged, the parties covenant and agrees as follows:

Definitions

In this Agreement, the following terms shall have the following meanings:

“Waterloo” shall mean the University of Waterloo;
“Mohawk” shall mean Mohawk College;
“RLS” shall mean the Honours Recreation and Leisure Studies program offered at Waterloo;
“RT” shall mean the Recreation Therapy 2-year Ontario College Diploma program offered at Mohawk.

Article I
Organization Information

Sending Organization
Mohawk
Community and Urban Studies
  • Recreation Therapy (2 year diploma)

Receiving Organization
Waterloo
Faculty of Applied Health Sciences
  • Department of Recreation and Leisure Studies
Article II
Terms of Agreement

This Agreement shall be effective from the date of signing, and expires on 30 June 2020 unless renewed in accordance with the “Terms for Renewal or Cancellation” section within this Agreement.

The terms of cooperation for each specific activity implemented under this Agreement, including any financial aspects, will be mutually discussed and signed-off by official representatives of both institutions prior to the initiation of that activity.

It is not the intent of this Agreement to create a legally binding partnership, and the participating institutions do not intend to impose financial obligations upon one another. Neither institution has the right to assign any duty or responsibility arising from the Agreement to another institution or individual without the written consent of the other participant.

Intellectual Property Rights

It is acknowledged that all copyrights, patents, trade secrets, trademarks or other intellectual property (“IP”) owned by one institution or participant prior to the date of the Agreement will remain the property of that institution or participant. IP jointly conceived or jointly first reduced to practice by both institutions, or by institutions and participants, and any IP individually conceived or first reduced to practice, in all cases by virtue of this Agreement, will be owned jointly or by the individual or the institution in keeping with University of Waterloo Policy 73 Intellectual Property Rights.

Indemnification

Mohawk shall indemnify and hold Waterloo, its governors, officers, faculty, students, employees, independent contractors, and agents harmless in respect of any claim, demand, action, cause of action, damage, loss, injury, cost, liability or expense, which may be made or brought against Waterloo or which Waterloo may suffer or incur as a result of or arising out of any breach or non-fulfillment of any representations, warranties, covenants, or other contractual obligations under this agreement or any negligence or willful misconduct on the part of Mohawk or anyone for whom Mohawk is responsible at law. Mohawk agrees that the foregoing indemnity shall survive the termination of this Cooperation Agreement notwithstanding any provisions of this Cooperation Agreement to the contrary. Students are not employees of Mohawk or Waterloo for the purposes of this arrangement.

Waterloo shall indemnify and hold Mohawk, its officers, students, employees, independent contractors, and agents harmless in respect of any claim, demand, action, cause of action, damage, loss, injury, cost, liability or expense, which may be made or brought against Mohawk or which Mohawk may suffer or incur as a result of or arising out of any breach or non-fulfillment of any representations, warranties, covenants, or other contractual obligations under this Cooperation Agreement or any negligence or willful misconduct on the part of Waterloo or anyone for whom Waterloo is responsible at law. Students are not employees of Mohawk or Waterloo for the purposes of this arrangement.

Miscellaneous

Items not covered by this Agreement may be determined and negotiated separately by both institutions without abrogating this Agreement. This Agreement does not prevent additional agreements between the institutions.
The participating institutions will ensure that all in-progress articulation activities will have the opportunity to be completed within a reasonable time frame; however, no new articulations will be undertaken after the expiration date.

**Terms for Renewal or Cancellation**

This agreement will be reviewed annually in March by a committee to ensure that the academic standards of each institute are being adequately met. The committee will be comprised of representation from the partner institutes, and shall ensure that no program or policy changes have occurred that may affect the accuracy of this Agreement, and agree on necessary changes to the Agreement. Two (2) members from both institutes shall be appointed. The committee shall conduct a minimum of one (1) meeting per year, and may include participation by video or audio conferencing.

Beginning in March 2018, and in March every three (3) years thereafter for which this Agreement has been extended, the committee will review performance pursuant to this Agreement. As part of the review, the committee shall incorporate an evaluation of cooperation and a recommendation of necessary changes (where applicable). As a result of the review, the parties may agree to extend this Agreement for an additional three years, beginning on 1 July of the then current year and expiring on 30 June of the third year thereafter. Such extension of this Agreement may be done with or without amendment. If no agreement is reached on extension of this Agreement by 15 June of the then current year, then this Agreement shall expire on 30 June of the then current year.

Any amendments to and renewals of this Agreement shall be done with a view to the integrity of each party’s academic programs, as well as to improve the processes and student articulation implemented under this Agreement, with a view overall to student success. The Agreement may be amended only in writing signed by all parties.

Termination of the agreement, with or without statement of the reasons for termination may be made in writing at any time and shall incorporate a six (6) month notice.

The parties agree that in the event of revision, expiration or termination of this Agreement, students enrolled in the program will have the opportunity to complete the program under the terms of this Agreement.

**Program and Policy Changes**

Mohawk and Waterloo agree to communicate any substantive changes at the annual review to their program including changes in admission standards, graduation requirements, curriculum, course offerings, length of program, hours of instruction, delivery method, co-op or work-integrated learning (where applicable). Substantive change is any change that alters learning outcomes, admission or graduation requirements, or delivery.

Mohawk and Waterloo agree to communicate any policy changes at the annual review which may affect the agreed upon relationship. Such policy changes will be considered during discussions at the time this Agreement is reviewed, as referred to above.

**Organizational Contacts**

The below named individuals are responsible for the development, maintenance and coordination of the Agreement. All notices or communications should be directed to the below named persons.
Article II
Agreement Information

Type of Agreement
Articulated Admission and Transfer Credit Agreement

Transfer Pathway Progression
The following table depicts typical progression (full-time course load of five courses per term, subject to course availability) for students moving from RT into RLS.

<table>
<thead>
<tr>
<th>Academic year:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program:</td>
<td>Mohawk RT</td>
<td>Off</td>
<td>Mohawk RT</td>
<td>Off</td>
<td>Waterloo RLS</td>
</tr>
<tr>
<td>Academic term:</td>
<td>F  W  S</td>
<td>F  W  S</td>
<td>2B</td>
<td>3A</td>
<td>S</td>
</tr>
<tr>
<td>Units per term:</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Unit totals:</td>
<td>11.0</td>
<td>13.5</td>
<td>16.0</td>
<td>18.5</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Admission Requirements

This agreement recognizes that a student who has completed a diploma at Mohawk in the two (2) year RT program, with a minimum average of 78%, including a minimum of 70% in an acceptable English writing course (COMM 11040 OR COMM LL041), will be eligible for admission into RLS with transfer credits as outlined in this Agreement.

Using the 105D/F form on the Ontario Universities’ Application Centre (OUAC), applicants will apply to the Honours Recreation and Leisure Studies (WX OUAC code) program at Waterloo. Mohawk applicants will be required to submit their high school transcript and all post-secondary transcripts, including their final Mohawk transcript showing graduation from the program.

Mohawk graduates will be considered in the same applicant pool as other external transfer students, but will be given preferential consideration over all other college RT programs where
agreements do not exist. Each student’s application and academic record will be assessed on an individual basis.

This Agreement recognizes the high quality of courses that Mohawk students currently take and the confidence Waterloo’s Faculty of Applied Health Sciences has in considering Mohawk graduates for admission.

Transfer Credit

Mohawk RT graduates are eligible for up to 8.5 units of transfer credit (equivalent of 16 courses of 0.5 unit weight).

Transfer credit according to the outline below will be offered to qualified students, transferring from the Mohawk RT program into the RLS program at Waterloo.

<table>
<thead>
<tr>
<th>Mohawk Course Code</th>
<th>Mohawk Course Title</th>
<th>UW Course Code</th>
<th>Lecture Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECLRL121</td>
<td>Introduction to Community and Leisure Services</td>
<td>REC 100</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10001</td>
<td>Introduction to Recreation Therapy</td>
<td>REC 151</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10005</td>
<td>Assessment and Documentation for Recreation Therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECLRL230</td>
<td>Recreation Programming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSCH10004</td>
<td>Research &amp; Evaluation Recreation Therapy</td>
<td>REC 270</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10008</td>
<td>Facilitation Techniques for Recreation Therapy</td>
<td>REC 351</td>
<td>0.50</td>
</tr>
<tr>
<td>RECL10010</td>
<td>Recreation for Diverse Populations</td>
<td>REC 1XX</td>
<td>0.50</td>
</tr>
<tr>
<td>RECLRL220</td>
<td>Foundations to Inclusive Recreation</td>
<td>REC 1XX</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10011</td>
<td>Leisure Education And Community Practice</td>
<td>REC 1XX</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10014</td>
<td>Disability Health and Function in Recreation therapy</td>
<td>REC 1XX</td>
<td>0.50</td>
</tr>
<tr>
<td>RECT10004</td>
<td>Program Design</td>
<td>REC 1XX</td>
<td>0.50</td>
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<tr>
<td>RECT10006</td>
<td>Anatomy and Physiology</td>
<td>AHS 150</td>
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<tr>
<td>PSYCAS407</td>
<td>Abnormal Psychology</td>
<td>PSYCH 257</td>
<td>0.50</td>
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<tr>
<td>PSYCASS271</td>
<td>Developmental Psychology</td>
<td>SDS 150R</td>
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</tr>
<tr>
<td>SSCISS108</td>
<td>Sociology 1</td>
<td>SOC 101</td>
<td>0.50</td>
</tr>
<tr>
<td>HMNSRL126</td>
<td>Group Dynamics</td>
<td>SPCOM 1XX</td>
<td>0.50</td>
</tr>
</tbody>
</table>

REQUIRED COURSE UNITS TRANSFERRED: UP TO 7.00

1 OUT OF THE FOLLOWING 2 PAIRS

<table>
<thead>
<tr>
<th>Mohawk Course Code</th>
<th>Mohawk Course Title</th>
<th>UW Course Code</th>
<th>Lecture Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECT10007</td>
<td>Recreation Therapy Practicum Seminar 2</td>
<td>REC 253</td>
<td>0.50</td>
</tr>
<tr>
<td>WORK10088</td>
<td>Recreation Therapy Practicum 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECT10010</td>
<td>Recreation Therapy Practicum Seminar 3</td>
<td>REC 253</td>
<td>0.50</td>
</tr>
<tr>
<td>WORK10128</td>
<td>Advanced Practicum for RT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PRACTICUM COURSE UNITS TRANSFERRED: UP TO 0.50
<table>
<thead>
<tr>
<th>Mohawk Course Code</th>
<th>Mohawk Course Title</th>
<th>UW Course Code</th>
<th>Lecture Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPELXXXXZ</td>
<td>Elective course</td>
<td>MISC 1XX</td>
<td>0.50</td>
</tr>
<tr>
<td>OPELXXXXZ</td>
<td>Elective course</td>
<td>MISC 1XX</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**ELECTIVE COURSE UNITS TRANSFERRED:**
**UP TO** 1.00

**TOTAL UNITS TRANSFERRED:**
**UP TO** 8.50

Elective courses offered by Mohawk may be assessed and awarded for transfer by the University of Waterloo on a case-by-case basis. Up to 1.0 units of elective courses may be awarded into the Recreation and Leisure Studies program at Waterloo.

The transfer credit assessment outlined in the chart above applies only to the pathway articulated in this Agreement. If students transfer to another plan at Waterloo, admission and transfer credits will be re-assessed and transfer credits may be reduced.

**Transfer credit requirements:**

Transfer credits, up to a maximum of 8.0 units, will be awarded for courses (listed above) in which a minimum grade of B- (70%) has been achieved.

In order to receive the transfer credit for REC 253 a grade of B- (70%) must be achieved in either RECT10007 or RECT10010 AND a grade of RM must be achieved in their respective WORK course. Applicants should submit their Job Description to adequately document their achievement.

**Credits that must be achieved at the receiving organization:**

Credits are as outlined by the Applied Health Sciences graduation requirements at Waterloo. All Faculty of Applied Health Sciences 4-year degrees require a minimum of 40 courses of 0.5 unit credit weight, for a total of 20 units.

**Credential(s) to be granted on successful completion of all required components:**

- Honours Bachelor of Arts, Recreation and Leisure Studies (4 year program)
  - Recreation and Sport Business
  - Recreation & Leisure
  - Therapeutic Recreation
  - Tourism Development

**Article IV**

**Communication and Marketing**

Communication

The Pathways Coordinator at Mohawk shall be responsible for the ongoing communication and monitoring of the Agreement at Mohawk Waterloo will designate an individual responsible for this Agreement at Waterloo.
These individuals will work together to develop marketing and recruitment strategies for this Agreement. Furthermore, the two individuals will co-ordinate annual pathway reviews.

Positioning

Opportunities pursuant to this Agreement will be advertised in the respective University and College promotional materials. Mohawk and Waterloo will exchange, where applicable, such items as marketing publications, academic calendars, student guides, housing information, course outlines, and/or research materials.

Each party will obtain the other’s consent before issuing any official media releases and/or marketing or promotional materials relating to this Agreement and/or incorporating the other party’s name or logo(s).

Mohawk agrees to inform its students of this Agreement in order to provide opportunity for eligible graduates of the RT program to apply to the RLS program and apply for transfer of credit. Mohawk agrees to set aside class time for promotion of this Agreement during the winter term of the first and second years of the RLS program.
Signatories

This Agreement is effective upon signature of all parties. The signatories hereby warrant that they have express and sufficient authority to execute this Agreement on behalf of the institutions on whose behalf they have signed.

For University of Waterloo

Dr. D. George Dixon  
Interim Vice-President Academic & Provost  
University of Waterloo  
I have the authority to bind the Corporation.

Date

For Mohawk

Christine Bradaric-Baus  
Vice-President, Academic  
Mohawk College  
I have the authority to bind the Corporation.

Date

Dr. James Rush  
Dean of Applied Health Sciences  
University of Waterloo  
I have the authority to bind the Corporation.

Date

Paul Armstrong  
Dean, Community and Urban Studies  
Mohawk College  
I have the authority to bind the Corporation.

Date
1.2. **Philosophy**  
Effective September 1, 2019

1.2.1. **Three-Year General Women’s Studies Gender and Social Justice**

Continuation in this academic plan requires a cumulative minimum overall average of 60% and a cumulative minimum **Women’s Studies Gender and Social Justice** major average of 65%.

Eligibility for graduation in the Three-Year General **Women’s Studies Gender and Social Justice** academic plan includes successful completion of the following requirements:

1. Appropriate Program-level requirements. See Bachelor of Arts Degree Requirements.
2. **Women’s Studies Gender and Social Justice** Plan-level requirements:
   - a minimum **Women’s Studies Gender and Social Justice** major average of 65%
   - at least six academic course units (12 courses) in **Women’s Studies Gender and Social Justice** approved courses, including:
     - two of WS 205, WS 206/LS 201, WS 207, WS 222/PHIL 202
     - four additional courses from the balance of the courses above and the following **Women’s Studies** approved courses
     - six additional courses from (see Note 1):
       - any additional GSJ courses
       - CLAS 311
       - ENGL 208L, ENGL 208N, ENGL 248, ENGL 325, ENGL 407, ENGL 463
       - ERS 225, ERS 265
       - FINE 216, FINE 281
       - FR 485
       - HIST 209, HIST 214, HIST 271, HIST 277/LS 237, HIST 351
       - HLTH 101, HLTH 102, HLTH 320/GERON 320, HLTH 352
       - INTEG 221
       - ITALST 111, ITALST 392/ITAL 392
       - JS 120/RS 111
       - PHIL 121, PHIL 201, PHIL 302
       - PSCI 370, PSCI 420, PSCI 421/LS 464, PSCI 472
Further Information Notes

1. Relevant special topics or readings courses not listed in the approved course list may be permitted at the discretion of the Gender and Social Justice undergraduate advisor.

2. For further information, please go to the Women's Studies Gender and Social Justice website.

1.2.2. Four-Year General Women's Studies Gender and Social Justice

Continuation in this academic plan requires a cumulative minimum overall average of 60% and a cumulative minimum Women's Studies Gender and Social Justice major average of 65%.

Eligibility for graduation in the Four-Year General Women's Studies Gender and Social Justice academic plan includes successful completion of the following requirements:

3. Appropriate Program-level requirements. See Bachelor of Arts Degree Requirements.

4. Women's Studies Gender and Social Justice Plan-level requirements:
   - a minimum Women's Studies Gender and Social Justice major average of 65%
   - at least eight academic course units (16 courses) in Women's Studies approved courses, including:
     - any additional GSI courses
     - two of WS 205, WS 206/LS 201, WS 207, WS 222/PHIL 202, WS 365, WS 475
     - eight additional courses from the balance of the courses above and the following Women's Studies approved courses
     - eight additional courses from (see Note 1):
       - any additional GSI courses
       - CLAS 311
       - ENGL 208L, ENGL 208N, ENGL 248, ENGL 325, ENGL 407, ENGL 463
       - ERS 225, ERS 265
       - FINE 216, FINE 281
       - FR 485
       - HIST 209, HIST 214, HIST 271, HIST 277/LS 237, HIST 351
       - HLTH 101, HLTH 102, HLTH 320/GERON 320, HLTH 352
       - INTEG 221
       - ITALST 111, ITALST 392/ITAL 392
       - JS 120/RS 111
Further Information Notes

1. Relevant special topics or readings courses not listed in the approved course list may be permitted at the discretion of the Gender and Social Justice undergraduate advisor.

2. For further information, please go to the Women's Studies Gender and Social Justice website.

1.2.3. Honours Women's Studies Gender and Social Justice

Continuation in this academic plan requires a cumulative minimum overall average of 60% and a cumulative minimum Women's Studies Gender and Social Justice major average of 70%.

Eligibility for graduation in the Honours Women's Studies Gender and Social Justice academic plan includes successful completion of the following requirements:

1. Appropriate Program-level requirements. See Bachelor of Arts Degree Requirements.

2. Women's Studies Gender and Social Justice Plan-level requirements:
   - a minimum Women's Studies Gender and Social Justice major average of 70%
   - at least eight academic course units (16 courses) in WS GSJ and Women's Studies Gender and Social Justice approved courses, including:
     - eight additional courses from the balance of the courses above and the following Women's Studies approved courses:
       - any additional GSI courses
     - CLAS 311
     - ENGL 208L, ENGL 208N, ENGL 248, ENGL 325, ENGL 407, ENGL 463
     - ERS 225, ERS 265
     - FINE 216, FINE 281
     - FR 485
     - HIST 209, HIST 214, HIST 271, HIST 277/LS 237, HIST 351
     - HLTH 101, HLTH 102, HLTH 320/GERON 320, HLTH 352
     - INTEG 221
Notes

1. Relevant special topics or readings courses not listed in the approved course list may be permitted at the discretion of the Gender and Social Justice undergraduate advisor.

2. For further information, please go to the Gender and Social Justice website.

Arts and Business (Co-op and Regular)

Students may combine the Honours Women's Studies Gender and Social Justice academic plan with Arts and Business. In addition to the Honours Women's Studies Gender and Social Justice requirements, students must also complete the Arts and Business requirements.

Honours double majors

Honours Women's Studies Gender and Social Justice may be taken in combination with most Arts majors in which an Honours major is offered or with many Honours majors in other faculties. For further information, see the Double majors section of Available Arts Academic Plans.

Further Information

For further information, please go to the Women's Studies website.

1.2.4. Women's Studies Gender and Social Justice Minor

Students enrolled in any degree program may pursue a minor designation in Women's Studies Gender and Social Justice.

The Women's Studies Gender and Social Justice Minor requires successful completion of a minimum of four academic course units (eight courses) in WS GSJ with a minimum cumulative average of 65%.

Further Information

For further information, please go to the Women's Studies Gender and Social Justice website.

1.2.5. Diploma Women's Studies Gender and Social Justice
Students enrolled in any non- or post-degree academic plan may pursue the Diploma in Women's Studies. Students with a university degree will be admitted and registered as post-degree students. Students without a university degree register as non-degree students.

A Diploma in Women's Studies-Gender and Social Justice may be helpful in understanding the dynamics of gender and social justice in social institutions, the workplace, government policy, and cultural and normative values. The Diploma is especially valuable for individuals interested in the health care, teaching or counselling professions, in social work, or in personnel and management fields.

Students enrolled in any non- or post-degree academic plan may pursue the Diploma in Women's Studies-Gender and Social Justice. Students with a university degree will be admitted and registered as post-degree students. Students without a university degree register as non-degree students.

Requirements

The Diploma in Women's Studies-Gender and Social Justice requires successful completion of a minimum of three academic course units (six courses) in WS GSJ with a minimum cumulative average of 65%.

Further Information

For further information, please go to the Women's Studies-Gender and Social Justice website.

Rationale: In 2015, the Women's Studies Board (disbanded in 2016 when Women's Studies moved into the Department of Philosophy) held a retreat facilitated by educational developer Meagan Troop in order to develop a new program name, mission, intended learning outcomes, and curriculum (with accompanying course revisions) in response to the following:

1. Recommendations by external reviewers for Women's Studies’ 2014 program review that Women’ Studies:
   a. Initiate a process to discuss the re-naming the program with an eye to distinguishing it from related programs at Wilfrid Laurier University and St. Jerome’s University and to building a more gender and otherwise diverse student cohort. One possibility would be Equity, Diversity, and Social Justice Studies, which would align the program to the University of Waterloo’s strategic priorities (Recommendation 2);
   b. If renamed, engage in a re-branding exercise, which would include creating a fresh mission statement, the development of a communications plan and promotional materials for the purposes of student recruitment and retention, and the marketing of the benefits of a three- and four-year major, honours and joint honours (Recommendation 3);
   c. Extend and clarify learning outcomes (intellectual and skills-based competencies) at each program level and identify clearer pathways through the program (Recommendation 5);
   d. Undertake a modest redesign of the WS “hosted” curriculum, with a focus on student recruitment and retention at the 100- and 200-levels and establishing a capstone and preparatory course for three- and four-year general majors and honours students respectively. This redesign would involve adjustments to the 100-level courses, the creation of an alternative 200-level recruitment/retention course, the development of a “Research in Action” course at the 300-level, and the strategic retitling of courses as necessary (Recommendation 6);
e. Strengthen and integrate intersectional course content and courses that focus on colonialism, contemporary neo-colonial realities, and Indigenous feminisms; racialization, transnationalism, and the experiences of people of colour; queer and trans studies; and disability issues (Recommendation 7);

f. Undertake a review of existing cross-listed and approved courses, taking into account demonstrated student demand, consistency with the unit’s program goals, mission statement, coherence, and level-specific learning outcomes, as well as the elimination of repetition of content (Recommendation 9);

2. The trend across North America to rename Women’s Studies programs in order to broaden their remit beyond women, specifically to include other genders, and other axes of identity (e.g., racialization, (dis)ability, migratory status, etc.) that intersect with gender;

3. Ongoing multi-year feedback from Women’s Studies’ prospective students, students, and alumni urging us to rename the program and broaden its focus beyond women.

At that retreat, and in a series of revisions thereafter, the Women’s Studies Board developed new learning outcomes, as well as a new mission statement, “about us” blurb, and supplementary explanation of intersectional feminism (all available upon request) At the same time, the Women’s Studies Board identified the proposed new program name, “Gender and Social Justice,” to capture the new mission and intended learning outcomes of the program.

Following the 2015 retreat, former Director of Women’s Studies Shannon Dea led the parallel process of (i) revising the Women’s Studies courses and curriculum in alignment with the program’s new mission and intended learning outcomes; (ii) consulting with campus stakeholders on the proposed name and mission change for the program.

That consultation included:

- a 2016 announcement at UGAG and solicitation there for feedback on the proposed name/mission change;
- emails (and, as necessary, follow-up emails) to all Arts departments, and to cognate programs in all faculties detailing the proposed name and mission changes, proposed plan changes, and proposed new/revised course descriptions for WS/GSJ-owned courses;
- in-person meetings with representatives of Anthropology; Economics; Peace and Conflict Studies; Sexuality, Marriage, and Family Studies; Studies in Islam; and with the Academic Dean at Saint Paul’s University College;
- two emails to all Women’s Studies majors and minors soliciting their input on the proposed name and mission changes, new learning outcomes, and proposed new/revised GSJ course descriptions.

That consultation was overwhelmingly positive. All but one of the programs and people Dea consulted expressed their full and enthusiastic support for the proposed new name and direction of the program. Women’s Studies students in particular were really excited about the proposed new direction for the program. One WS major wrote, “I love the new name and am super excited to have it on my degree, as I believe it encapsulates what we do in the program way more, and I think will open more doors for the graduates (in terms of being more inclusive).” The other student responses were in the same key.

The only criticisms Dea heard in her consultations were as follows:

1. One Undergraduate Advisor agreed with the global changes, but suggested (i) that the proposed new methods course (GSJ 304: Research as Resistance) should be earlier in progression, and (ii) that the description for that course should include less social justice language because (on the respondent’s view) research methods should be distinct from social justice goals.

Response: (i) GSJ students may take GSJ 304 at any time in their progression once they have satisfied the prerequisite (GSJ 101 or GSJ 102); (ii) the distinctiveness of GSJ 304 resides in the connections it
draws between research methods and social justice; further, GSJ 304 adopts a post-positivist framework
that seeks to problematize the still largely dominant notion that research methods can or should be
objective; Dea piloted the course in 2017 and found both the level of study and the intersection of
research methods and social justice fruitful.

2. One program expressed concern (a) that renaming Women’s Studies as Gender and Social
Justice would wrongly imply that it is the only University of Waterloo program that is oriented
around social justice. The program more recently expressed the further concern (b) that
Women’s Studies’ new name ought to retain “woman/women” or include “feminist/feminism”
in order to align with the most common names of similar programs across the country, and in
order to ensure that women and feminism are properly centred in the program.

Response: (a) WS/GSJ recognizes the excellent social justice scholarship and teaching and learning that
is conducted by other programs at University of Waterloo. Indeed, many of the courses in the proposed
GSJ plans are housed in those programs. The new name is not intended to imply that GSJ corners the
market on social justice. Rather, it is intended (i) to accord with the external reviewers’
recommendations, and (ii) to make explicit the program’s new, broader focus on social justice issues as
they emerge in and beyond gender. Indeed, it is the hope of WS/GSJ that the new name and new plans
will help students who are interested in social justice identify and connect with the various departments
on campus where excellent social justice teaching and learning are occurring. (b) WS/GSJ agrees with its
external reviewers’ recommendations that (Recommendation 2) the new name distinguish the program
from the Women and Gender Studies program at Wilfrid Laurier, and (Recommendation 7) that the
WS/GSJ strengthen and integrate its focus on intersectionality; colonialism, contemporary neo-colonial
realities, and Indigenous feminisms; racialization, transnationalism, and the experiences of people of
colour; queer and trans studies; and disability issues. WS/GSJ think that the proposed new name aligns
well with, and communicates clearly, its strengthened commitment to an intersectional feminism that
takes seriously all forms of oppression.

More details on the proposed new name:
As indicated above, in recent years North American Women’s Studies programs have one by one been
rebranding in order to make salient the broad scope of their scholarship. The proposed new name aligns
with similar changes in programs across the country, which have adopted the following names:

- University of Alberta, M.A. in Gender and Social Justice Studies
- UBC, M.A. and PhD in Gender, Race, Sexuality and Social Justice
- Nipissing University, B.A. in Gender Equality and Social Justice
- University of PEI, B.A. in Diversity and Social Justice Studies
- McGill, B.A. in Gender, Sexuality, Feminist, and Social Justice Studies

Other Women’s Studies programs across the country have adopted such names as “Women and Gender
Studies” and variations on “Gender and Sexuality Studies.” The UW Women’s Studies Board opted
against using either of those formulations, and sought instead to identify a program name that makes
explicit that the scope of the program extends beyond women, and indeed beyond gender simpliciter.
Further, the Board rejected any name including “sexuality” because St. Jerome’s University’s
Department of Sexuality, Marriage, and Family Studies remains the best program at University of
Waterloo for students who wish to focus on human sexuality.

More details on the proposed new plans:
The proposed new plans retain the structure of current UW Women’s Studies plans with the following
exception. At present, WS plans include three lists: required core courses, other core courses among
which a minimum number must be taken, other non-core courses students may use to fill out their
requirements. The proposed new major plans include only two lists: required core courses, and other
courses from both WS/GSJ and other programs students may take to fill out their GSJ plans. Reducing
the total number of core courses GSJ majors must take affords those students more overall flexibility in
their course choices, thereby allowing them to customize their studies, and facilitating their pursuit of double majors and minors. At the same time, the new plans ensure that all GSJ majors take the same suite of core courses, ensuring that in this way they all satisfy plan level learning outcomes.

In designing the new plans this way, Women’s Studies seeks to make explicit one of the distinctive features of a GSJ major: to wit, students in that major all receive a thorough, common grounding in the interdisciplinary scholarship of gender and social justice, while complementing that core with training in one or more of the disciplines whose courses contribute to GSJ plans. Thus, one GSJ major may choose to focus on gender and social justice in the social sciences, while another might zero in on the humanities, or on a range of disciplinary areas.

Other noteworthy changes to the plans are as follows:

- First-year courses (GSJ 101 and 102) introduce the students to gender issues as they occur in, respectively, the global North and the global South. This is a more contemporary, global approach than the current WS 101 and 102, which are more historical and more North American in focus;
- Concomitantly, students’ introduction to the history of the area will now occur at the second-year level in GSJ 203;
- We have introduced a new methods course, GSJ 304;
- We have introduced fourth year theoretical (GSJ 472) and practical (GSJ 473) seminars as capstones to the program. These courses are mandatory for four-year majors and optional for GSJ students in other plans.
Major Awards

SSHRC Institutional Grant

The University of Waterloo has been awarded $440,553 over the next three years ($146,851 per year) as a SSHRC institutional grant. This award is an increase of $42,813 over the previous award.

Background: Every three years all SSHRC-eligible institutions must re-apply for the SSHRC Institutional Grant. The value awarded is based on the number of SSHRC-eligible, full-time faculty members at the institution, and the quality of the proposal submitted. For 2014-2017, we were awarded $397,740. These funds support our internal UW/SSHRC Seed and Travel grant competitions.

NSERC CREATE (Collaborative Research and Training Experience) Program

Catherine Burns, along with ten co-applicants, were awarded a CREATE grant of $1.65 million, over six years. The project, titled Training in Global Biomedical Technology Research and Innovation, aims to develop the only “needs-first” biomedical technology graduate program in Canada. The abstract explains:

Trainees will learn the process of innovation; from needs identification, to invention, through implementation. Our program offers clinic and industry internships, commercialization courses, international exchange, multi-disciplinary co-supervision, and professional skills workshops. The technical expertise, professional skills, and interdisciplinary experiences gained from participation in this program will produce job-ready trainees capable of transforming the Canadian health technology landscape.

International Research Partnerships

The University of Waterloo has signed a joint research agreement with two Japanese organizations to develop effective methods to engineer safe and secure embedded software targeting the manufacturing and automotive sectors.

The five-year project, Hasuo Metamathematics for Systems Design, is led by Krzysztof Czarnecki, professor of electrical and computer engineering, and Ichiro Hasuo, associate professor at the National Institute of Informatics, and valued at $1.4 million.

The goal of the project is to develop effective specification, verification, and synthesis methods with a focus on self-driving cars, which will be demonstrated on Waterloo’s autonomous driving research vehicle, Autonomoose.

Funded through the Japan Science and Technology Agency’s Exploratory Research for Advanced Technology program, the project is comprised of four research themes with three hosted at the National Institute of Informatics in Tokyo and one hosted at Waterloo.
The Exploratory Research for Advanced Technology program is one of the Japan Science and Technology Agency's flagship Strategic Basic Research Programs targeting advanced technology. Only two or three research projects are funded through this program each year.