UNIVERSITY OF WATERLOO
SENATE GRADUATE & RESEARCH COUNCIL
NOTICE OF MEETING

DATE: Monday 9 May 2022 Chair – J. Casello
TIME: 10:30 a.m. – 12:00 noon
PLACE: Microsoft Teams

AGENDA

Item	Action
1. Declarations of Conflict of Interest	
a. Excerpt from Bylaw 1, section 8*	Information
2. Minutes of 11 April 2022* and Business Arising	Decision (SGRC)
3. Co-chairs' Remarks	Information
4. Discussion regarding SGRC (40 minutes)	
a. Senate Governance Review Feedback – briefing document, including ADR/ADG memos for discussion	Input/Discussion
5. Graduate Studies and Postdoctoral Affairs - Policy 30 – Employment of Graduate Student Teaching Assistants* (Nadia Singh)	Input/Discussion
6. Academic Program Reviews	
a. Two -Year Progress Report: Global Governance* (Suzan Ilcan/Andrew Thompson)	Decision (SGRC)
b. Two -Year Progress Report: Theological Studies* (Carol Penner)	Decision (SGRC)
7. Research Centres and Institutes	
a. Interdisciplinary Centre on Climate Change (IC3)* - Name Change (Sarah Burch)	Decision (SGRC)
8. Curricular Submissions	
a. Engineering* (Sivoththaman)	1a,c; SEN-Regular
b. Environment* (Deadman)	1 SEN-Regular
c. Health* (Laird)	3.12-3.14 SEN-Regular 4.12 SEN-Regular
d. Mathematics (Guenin)	2,3; SEN-Regular
9. Graduate Awards* (Simm)	
a. Adosi Graduate Scholarship for Food & Agriculture - trust	Decision (SGRC)
b. Janet E.A. McDougall Scholarship in Pharmacy – endowment	Decision (SGRC)
c. Doctoral Thesis Completion Award – operating	Information
d. Harvey Bains and Ben Kaak Doctoral Award - trust	Information
e. Buitrago Opportunity Graduate Scholarship - trust	Information
f. Master of Environment and Business Award – operating	Information
g. Dr. Derick Wood Graduate Scholarship in Computer Science - endowment	Information
10. Other Business	Information
11. Next Meeting: 13 June 2022 from 10:30 a.m. - 12 noon; Microsoft Teams	Information

*material attached
"SGRC" to be approved on behalf of Senate
"SEN" to be recommended to Senate for approval

2 May 2022

Kathy Winter, PhD, CPsych
Assistant University Secretary

Excerpt from Senate Bylaw 1

8. Declarations of conflict of interest

8.01	At the beginning of each meeting of Senate or any of Senate's committees or councils, the chair will call for members to declare any conflicts of interest with regard to any agenda item. For agenda items to be discussed in closed session, the chair will call for declarations of conflict of interest at the beginning of the closed portion of the meeting. Members may nonetheless declare conflicts at any time during a meeting.
8.02	A member shall be considered to have an actual, perceived or potential conflict of interest, when the opportunity exists for the member to use confidential information gained as a member of Senate, or any of Senate's committees or councils, for the personal profit or advantage of any person, or use the authority, knowledge or influence of the Senate, or a committee or council thereof, to further her/his personal, familial or corporate interests or the interests of an employee of the university with whom the member has a marital, familial or sexual relationship.
8.03	Members who declare conflicts of interest shall not enter into debate nor vote upon the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).
8.04	Where Senate or a committee or council of Senate is of the opinion that a conflict of interest exists that has not been declared, the body may declare by a resolution carried by two-thirds of its members present at the meeting that a conflict of interest exists and a member thus found to be in conflict shall not enter into debate on the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).

University of Waterloo
SENATE GRADUATE & RESEARCH COUNCIL
Minutes of the 11 April 2022 Meeting
[in agenda order]
Microsoft Teams Meeting Videoconference

Present: Charmaine Dean, Maureen Drysdale, Anna Esselment, Ana Ferrer, Bertrand Guenin, Alison Hitchens, Julie Joza, Brian Laird, Glaucia Melo, Ian Milligan, Liz Nilsen, Jennifer Reid, Jerika Sanderson, Sophia Sanniti, Marianne Simm, Simron Singh, Siva Sivoththaman, Richard Staines, John Thompson, Shawn Wettig, Kathy Winter (secretary).

Resources: Trevor Clews, Carrie MacKinnon-Molson, Amanda McKenzie.

Guests: Suzanne Kearns, Deborah Kraft, Kristen Muller, Reina Neufeldt

Regrets: Jeff Casello*, David Clausi*, Anita Layton, Bessma Momani, Martin Ross, Mike Szarka, Aiden Huffman

Organization of Meeting: Charmaine Dean, co-chair of the council, took the chair, and Kathy Winter acted as secretary. The secretary advised that due notice of the meeting had been given, a quorum was present, and the meeting was properly constituted.

1. DECLARATIONS OF CONFLICT OF INTEREST

No conflicts of interest were declared.

2. MINUTES OF 7 MARCH 2022 AND BUSINESS ARISING

By consensus, the minutes were approved as distributed.

3. CO-CHAIRS' REMARKS

On behalf of council, Dean thanked Sanderson and Sanniti for their service to this committee and wished them well on their future endeavors.

4. ACADEMIC PROGRAM REVIEWS

On behalf of Senate, council heard a motion to approve the following, as presented:

a. Final Assessment Report – Taxation. Esselment and Ferrer. Carried.
b. Final Assessment Report – Peace & Conflict Studies. Sanniti and Esselment. Carried.
c. Two-Year Progress Report – Biology. Thompson and Reid. Carried.

5. CURRICULAR SUBMISSIONS

Collaborative Aeronautics Program

Council heard an omnibus motion to recommend to Senate to approve the following Faculties joining the Collaborative Aeronautics Program (CAP), effective 1 September 2022, as presented:

a. Environment: Master of Environmental Studies in Sustainability Management – Aeronautics; Doctor of Philosophy in Sustainability Management – Aeronautics; Master of Arts in Planning – Aeronautics; Master of Environmental Studies in Planning – Aeronautics; Master of Arts in Global Governance – Aeronautics (joint with Arts)
b. Engineering: Doctor of Philosophy in Systems Design Engineering – Aeronautics; Master of Applied Science in Systems Design Engineering – Aeronautics.
c. Science: Master of Science in Vision Science – Aeronautics; Doctor of Philosophy in Vision Science – Aeronautics.
d. Arts: Master of Arts in Psychology – Aeronautics; Master of Arts in Global Governance – Aeronautics (joint with Environment)

Singh and Guenin. Carried.

Faculty of Arts
On behalf of Senate, council approved item 5d-c (Esselment and Singh. Carried.) and 5d-d (Esselment and Guenin. Carried.) as presented.

6. OTHER BUSINESS
Dean gauged interest in holding the May 2022 meeting of Senate Graduate and Research Council in person. Council members were asked to email their preference to Secretary Winter following the meeting.

7. NEXT MEETING
The next meeting will be held Monday 9 May 2022 from 10:30 a.m. to 12 noon; Location TBD.

20 April 2022

Kathy Winter, PhD, CPsych,
Assistant University Secretary

UNIVERSITY OF WATERLOO

To:	Senate Graduate & Research Council
From:	Charmaine Dean, Vice-President, Research & International Jeff Casello, Associate Vice-President, Graduate Studies and Postdoctoral Affairs
Date:	2 May 2022
Subject:	Senate Governance Review Feedback – Briefing Document for Discussion

As you are aware, there has been a request by the Associate Deans Research to rethink the structure of SGRC. To facilitate conversation on this issue, substantive time at the 9 May 2022 SGRC is being allocated to the topic—with follow up discussion schedule for 13 June 2022 SGRC.

Attached, please find memos submitted by the Associate Deans Research (ADR) and Associate Deans Graduate (ADG) that form the basis of, as well as inform this important conversation.

For Action:
In advance of next Monday's meeting, please review the 2 attached memos and carefully consider your responses to the following core questions. Your advanced preparation will ensure fruitful conversation and brainstorming as we seek input from each and every council member.

Core questions

1. Strengths and Weaknesses of Current Operations:
   a. What works well within SGRC?
   b. What does not work well within SGRC?
   c. What are the main concerns with SGRC?
2. Options for Addressing Concerns:
   a. How could we improve efficacy of existing SGRC through development of new operational models and strategic discussions?
   b. Shall we consider other options and/or solutions, including alternate designs / structures of Councils?
   c. What would be lost and what would be gained with alternate designs?

SENATE REFORM

Establishment of Senate Research Council

Proposed by Associate Deans Research
March 1 2022

Proposal

In response to the call for Senate reform at the University of Waterloo, a revised academic structure to properly and more effectively support both graduate studies and research at the University of Waterloo (UW) is proposed. The revised academic structure is to convert the Senate Graduate and Research Council (SGRC) to its pre-2003 state as two separate councils, namely, the Senate Graduate Council (SGC) and the Senate Research Council (SRC). Creating an SRC will enable the institution to meet its strategic objective of "advancing research for global impact".

Background

The SGRC is a formal council of Senate established and defined in Senate Bylaw 2 which sets the membership and duties of SGRC. SGRC has the mandate of "considering all questions related to the academic quality of graduate studies and research activity with the university". In 2003, SGRC was formed by merging the original Senate Research Council (SRC) and original Senate Graduate Council (SGC). The Appendix contains relevant excerpts from Senate indicating reasoning for merging the councils in 2003.

Motivation

1. **New institutional challenges**. There are many new challenges affecting the UW research landscape: security risks, equity/diversity/inclusivity, data management, role of centers/institutes, large-scale research grants of national importance, intellectual property, entrepreneurship, as examples. Academic input and discussion on these topics are essential yet there currently is no academic group on campus that is capable and committed to providing academic input on these topics. A Senate Research Council would satisfy these needs.
2. **Enabling research growth**. Given UW's growth in faculty complement and corresponding growth in research productivity, infrastructure, and ambitions over the last 20 years coupled with expectations of future impact, an academic mandate and discussion forum for research is required necessitating a Senate Research Council. That there is currently no dedicated forum for academic research discussions is detrimental to UW's strategic interests.
3. **Research academic representation**. SGRC is skewed with roughly 80% of agenda topics dedicated to graduate studies and 20% dedicated to research. Typical graduate items include academic calendar changes, program reviews, curriculum submissions and graduate awards. Typical research items include ethics committee membership approvals and centre/institute renewals, but do not involve many of the challenges summarized in (1.) above. . Further, Associate Deans Graduate (ADGs) do not have the basis to address research administrative issues while Associate Deans Research (ADRs),

similarly, do not have the basis to address graduate issues. Departments and faculties should have the ability to percolate concerns from grassroots into a functional, academic decision-making pipeline to improve research decision making, utilize lines of communications, provide a voice for the institution, and provide forums for active academic ideas and opinions. None of this exists now and a Senate Research Council will enable such academic necessities.

4. **Motivation for 2003 merger no longer applicable**. Graduate studies, undergraduate studies and research each have different mandates even though there are relationships between these mandates. As such, each of these domains require a separate academic body reporting to Senate. The Senate recorded, when SGRC was created in 2003, that creating SGRC "*is seen as a streamlining effort (the Councils have significant overlap) and a way to integrate even further graduate studies and research activities on campus.*" but this has not been achieved because the "streamlining" has led to the neglect of academic research advocacy, there are no noticeable overlaps, and there is very little (if any) integration of "graduate studies" and "research" via SGRC. The original merger had good intentions, but operationally these are not applicable today and SGRC has been implemented at the expense of not providing a forum for academic research discussions and advancements.
5. **Revised process to support academic research.** Major initiatives and implementations for research should be discussed and refined with the Research Operations Council (ROC). Items that require Senate approval will then move from ROC to the Senate Research Council which would be a broader body of representation (i.e., involving other stakeholders to scrutinize) to support formal academic approval. ROC, comprised of the ADRs and Vice-President Research and International (VPRI) can discuss and process based on positions that are committed to the research mandate on campus before receiving formal approval. Other institutional decisions not requiring formal Senate approval would be sent to Deans Council for ratification and institutional support.
6. **Non-voting status**. If knowledge of committee activities being cross-fertilized between SRC and SGC is desirable, it is recommended that ADGs be non-voting members of SRC and, similarly, ADRs be non-voting members of SGC. This non-voting mechanism (where non-voting positions do not count towards quorum) will allow ADs to either provide feedback to their counterpart AD or attend SRC/SGC meetings in a non-voting capacity to have the opportunity to provide insights from their perspective on issues.

On behalf of all Associate Deans Research, thank you for the consideration of this valuable initiative to benefit the University of Waterloo to improve the research mandate on campus. We are happy to have a discussion to address any feedback on this proposal.

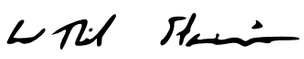
Amelia Clarke – Associate Dean Research, Environment

David Clausi – Associate Dean Research & External Partnerships, Engineering

Ana Ferrer

Ana Ferrer – Associate Dean Research, Arts

Anita Layton – Associate Dean Research and International, Math



Richard Staines – Associate Dean Research, Health

John Thompson

John Thompson – Associate Dean Research (Acting), Science

Appendix

From the minutes of the 24 March 2003 Senate meeting:

"Graduate and Research Councils. *The Vice-president, University Research presented this report to Senate for information (distributed at Senators' places). The possible merger of these two Councils will be brought back to Senate. It is seen as a streamlining effort (the Councils have significant overlap) and a way to integrate even further graduate studies and research activities on campus. A merger will require an amendment to the relevant Senate bylaws (8 and 12). In order to facilitate continued discussions, it is proposed that the April meeting of Senate consider extending the current terms of Council members for two months (to June 30, 2003). Bylaw changes could be introduced at the May and June meetings of Senate."*

Also, by way of background, SGC and SRC had begun to hold joint meetings beginning on 11 February 2003, from their joint report to Senate 24 March 2003:

"On a trial basis, Senate Graduate and Research Councils are holding joint meetings, co-chaired by the Associate Dean, Graduate Studies (Jim Frank) and the Vice-president, University Research (Paul Guild). The first joint meeting was held on February 1 1, 2003. Councils forward the following items to Senate, for information..."

First reading of the bylaw changes to join SGC and SRC occurred at the 20 May 2003 meeting. The minutes are incredibly brief:

"Amalgamation of Senate Graduate and Research Councils - ***Revised Bylaws 8 and 12.***

Senate agreed to amalgamate the two Councils and approve the revised Bylaw 8 for first reading.

Waller and Helmes-Hayes. Carried."

Also see the attached pdf of the open Senate minutes and agenda.

The second reading occurred at the 16 June 2003 meeting of Senate. From the minutes:

"Second Reading of Bylaw Number 8; Appointments to Graduate & Research Council.

Senate agreed to approve Bylaw Number 8 for second and final reading and approved the slate of Faculty, Federated & Affiliated College and graduate student representatives to the Council as presented in the agenda package.

Guild and George. Carried."

Comments on the current and future function of Senate Graduate and Research Council

The University is undertaking an assessment of its governance structure, with a focus on the University Senate and its associated Councils. Concurrently, conversations have been underway regarding the efficacy of the joint Senate Graduate and Research Council (SGRC). To inform the University's decision-making on its governance bodies, the Associate Vice President Graduate Studies and Postdoctoral Affairs (AVPGSPA) consulted the graduate studies leadership team – the Faculty Associate Deans Graduate Studies (ADGs) and the Assistant Vice Presidents, GSPA – to seek their input on improving the effectiveness of SGRC.

The summary of this consultation is as follows:

- There is an acknowledgement that substantive portions of SGRC meetings are spent on curricular changes which may not be of particular relevance or interest to the Associate Deans Research (ADRs);
- There is also a recognition that the ADRs portfolio tends to focus more on interactions with faculty members than with graduate students;
- Agenda items led by the ADRs – most notably Centre and Institute renewals – are of interest to the ADGs as these research activities are important sources of engagement for graduate students;
- There remains some confusion as to the role of SGRC in reviewing Centres and Institutes in that they come to the Council having been reviewed and approved by the Research Council. Providing clarity on SGRC's role will be helpful;
- There is a perceived common (among ADGs and ADRs) interest in postdoctoral scholars that is not regularly addressed at SGRC;

Generally, the ADGs find value in maintaining a common Graduate and Research Council of Senate, but changes should be considered to improve its efficacy. Suggestions for improvement include:

- Providing greater clarity on the purpose of the curricular reviews such that their consideration can be streamlined. The observation was made that substantial time is spent on presenting what can be considered minor curricular changes – titles and descriptions of courses, program requirements, etc. – that are rarely contentious. If the Council were to develop a new operational model that still met the governance obligations, but expedited the review, more time may be available at SGRC meetings for other considerations.
- Including strategic discussions as part of the SGRC agenda such that there is a balance between the operational strategic functions of SGRC, in keeping with proposed changes at Senate. To this end, motivating the introduction of strategic discussions from all stakeholders – co-chairs, ADGs, ADRs, Students and other members – may increase the value of SGRC meetings and may advance the common goals of the graduate studies and research communities. One avenue to this goal would be to offering more opportunities (or, perhaps, making clearer existing opportunities) for Council members to construct the meeting agendas.

There is interest in continuing this conversation collectively with SGRC membership.

TO:	**Members, Senate Graduate and Research Council**
FROM:	**Jeff Casello, Associate Vice President Graduate Studies and Postdoctoral Affairs; Chair, Policy 30 Drafting Committee**
DATE:	**25 April 2022**
RE:	**Policy 30 – Employment of Graduate Student Teaching Assistants Policy Prepared for Consultation**

Policy 30 – Employment of Graduate Student Teaching Assistants (Policy 30) was first established in May 2014. In 2016, a Policy Drafting Committee was formed and began their work under the following terms of reference:

The Policy Drafting Committee (PDC) will:

1. In accordance with Policy 1 – Initiation and Review of University Policies, be responsible for writing amendments to the existing Class Z Policy 30 – Employment of Graduate Student Teaching Assistants (the "Policy") which will formalize the manner in which teaching assistantships are distributed and administered, and which will build upon the framework set out in the current version of the Policy established and last updated on 1 May 2014. The revised Policy will use the current Teaching Assistant rate approved by the Vice-President, Academic & Provost;
2. Meet at the call of the chair to jointly draft the new policy;
3. At its discretion, seek input from members of the University community on any matters or questions it deems relevant to the PDC's work;
4. Submit the new policy for recommendation to the Graduate Student Relations Committee ("GSRC"). The GSRC will consider the draft policy in accordance with Policy 1.
5. Strive to reach a consensus on the content of the draft policy. It is understood that differences of opinion may arise that cannot be resolved between members; in such cases, the chair of the committee will decide on what shall be included in the draft policy, and any points of contention shall be noted by the committee in making its recommendation to the GSRC.

Membership on the PDC has included the following individuals:

Chairs to the Committee
Jim Frank (then Associate Provost, Graduate Studies)
Jeff Casello, Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Associate Deans, Graduate Studies
Robert Hill
Linda Warley
Kirsten Muller

Secretarial Support
Melissa Knox
Alice Raynard
Nadia Singh

Graduate Students (representing the Graduate Student Association)
Robert Bruce, former president, GSA
Jessica Brake, GSA appointment
Maya D'Alessio, former president, GSA
Norman Kearney, GSA appointment
Rachel Mitchell, GSA appointment
Jennifer Reid, GSA appointment
Max Salman, GSA appointment
Naima Samuel, former president, GSA

In their efforts, the PDC aimed to establish principles and practices that support the delivery of the University's academic mission while acknowledging the diversity of responsibilities that our graduate students hold while serving as a TA.

The draft Policy has now been completed to the satisfaction of both the PDC and the Graduate Student Relations Committee (GSRC). Approval of the attached draft was received at the GSRC meeting on 28 September 2021.

The attached draft has been informed by feedback received from:

- Associate Deans Graduate Studies and Faculty Graduate Administrators, recurringly through the Graduate Operations Committee;
- The Graduate Student Association Council in April 2021;
- The Undergraduate Operations Committee in February, 2020 and April 2021;
- Deans' Council, April 2021;
- Human Resources, most recently in September 2021.
- The Centre for Extended Learning, May 2021.
- The Faculty of Mathematics (where the administration of TAs is unique relative to the other Faculties) most recently in May 2021.

At the Provost's direction, the draft is being circulated for formal consultation. The scheduled consultations include:

- Deans' Council;
- Undergraduate Operations;
- Faculty Relations Committee;
- Human Resources;
- Legal and Immigration Services; and
- Senate Graduate and Research Council.

The results of these consultations will be any final modifications to the Policy prior to its presentation to Senate.

Some of the highlights of the changes made to the Policy in this draft include:

1. The Policy is written with an aim to create a collegial and respectful relationship between Instructors, TAs and the administrators responsible for overseeing TA appointments (see section 1 and section 5).

2. The Policy defines the role of the TA Administrator, who is responsible for TA appointments and for being a point of contact for support.

3. The Policy establishes expectations of the University, the TA Administrator, the Instructor and the graduate student (see section 6) that further emphasizes the collegial goals of successful, collaborative course delivery.

4. Around TA appointments (see section 7), the Policy requires that:
    a. TA opportunities and the skill sets required for the TA be made known to students in advance of TA appointments;
    b. The process by which TAs are appointed is transparent to students and instructors, and is based on a match of skills to needs and funding requirements;
    c. Appointments are made formally, through a letter of appointment (See Appendix B) that specifies normal conditions of employment.

5. The Policy also makes evident that if a student declines or fails to respond to a TA opportunity, this can be perceived as declining funding, superseding the student's offer letter.

6. The Policy requires a formal agreement (see Appendix C) between the instructor and the TA that articulates the specific responsibilities and estimated hours for the TA; the TA and Instructor should also engage in regular conversations on how the student's actual hours are progressing relative to the agreement and the term allocation.

7. The Policy makes explicit (see section 8.3) that student's hours in training that are required for employment, or have value beyond the course, will not be included in their termly allocation; training specific to the course will be part of this employment relationship.

8. The Policy has a dispute resolution process (see section 9.) that includes the following pathways:
    a. Conversations between the instructor and the TA;
    b. Conversations between the instructor and the TA, with the help of the TA administrator, or a mediator;
    c. A formal process with specific timelines and requirements for written submissions to be adjudicated by the Dean or delegate. The committee felt this path was appropriate because there may be concerns about Faculty members' activities that are under the purview of the Deans.

9. The Policy allows for a TA appointment to be suspended with pay while the dispute resolution process is undertaken. This allows the instructor to have appropriate support in the delivery of the course while the TA appointment is interrupted.

10. The Policy requires an end-of-term evaluation of the TA that will be provided to the TA administrator and can inform subsequent TA appointments.

11. The Policy (Appendix D) makes suggestions on the dates by which TA appointments should be made.

In previous reviews, the following concerns have been raised and are acknowledged to require additional attention:

Section 6.1

Concerns remain about how to identify a transparent selection process. The goals of that language include ensuring that students with appropriate skill sets are considered for TA positions and that the method of assigning students to TA positions is visible to students. This goal is further articulated in section 6.2.

Section 7.2

Concerns remain about the statement: "*The choice between appointing undergraduate or GTAs shall be made based on pedagogy and shall not be made on the cost incurred by the unit…"* This point was particularly important to our graduate student members of the Policy 30 drafting committee who held the perception that there is competition for TAs among undergraduates and graduate students.

Section 7.6.2

This section currently addresses the situations where a graduate student is unable to accept or continue in a TA placement due to their health. What has been identified as unclear is which University office(s) makes this designation. Conversations are ongoing with AccessAbility Services and Occupational Health to clarify this question.

Section 7.6.2 does not currently address the situation where a graduate student wishes to accept a TA appointment, but will require "workplace accommodations". Conversations are again ongoing with AccessAbility and Occupational Health to determine how this situation shall be addressed.

There will also need to be more general conversations about funding. In most cases, Faculties use TAships to meet minimum funding requirements. In cases where students are not able to TA due to their health, alternative funding structures and methods may be necessary. While these pathways won't likely be articulated in Policy, determining these outcomes concurrent with the Policy implementation will be useful.

Section 9.2

This section allows for the TA administrator, as part of the informal process, to terminate a TA position. This presents a lack of clarity because despite the TA position being terminated, the student still has the option of seeking a formal resolution through the Dean's office. This will need to be resolved.

Policy 30 – Employment of Graduate Student Teaching Assistants

The policies found on the website of the Secretariat are compulsory rules for the University community. The authoritative copies of the policies are held by the Secretariat and bear the seal of the University. The online version accessible through the website of the Secretariat is available for information purposes only. In case of discrepancy between the online version and the authoritative copy held by the Secretariat, the authoritative copy shall prevail. Please contact the Secretariat for assistance if necessary.

Established:	1 May 2014
Revised:	[X-X-2021]
Mandatory Review Date:	TBD
Supersedes:	N/A
Class:	Z
Responsible/Originating Department:	Graduate Studies and Postdoctoral Affairs
Executive Contact:	Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Related Policies, Guidelines and Procedures:
Policy 33 – Ethical Behaviour
Policy 40 – The Chair
Policy 42 – Prevention and Response to Sexual Violence
Sexual Violence Response Protocol and Procedures
Policy 70 – Student Petitions and Grievances
Policy 71 – Student Discipline
Policy 72 – Student Appeals
Employment of Graduate Students – Special Arrangements
Graduate Studies Calendar committees:
Graduate Student Relations Committee
Graduate Studies Calendar guidelines on graduate student support
Graduate Studies Calendar guidelines on Resolution of disputes between TAs and instructors and RAs and supervisors

Capitalized terms used in this policy and its appendices and not otherwise defined in this policy have the meaning assigned to them in Appendix A.

1. Introduction

Teaching Assistantships (TAs) are opportunities for academic, personal and professional development for graduate students that enhance the experiences of undergraduate students, complement the work of course instructors (Instructors), and help meet the academic mission, vision, and values of the University of Waterloo (the University). Given the contributions of Graduate Teaching Assistants (GTAs) to the University's goals, including supporting instructors and facilitating the attainment of the learning outcomes for students, financial compensation is provided for TAs.

Most importantly, Teaching Assistantships constitute a critical element of the University's ability to deliver high quality classes and academic experiences to its students. As a result, TAs are bound by formal performance expectations, the satisfactory completion of which promotes positive outcomes for all stakeholders.

This Policy describes the terms and conditions that apply to the appointment of GTAs and administration of TAs held by graduate students at the University. The Policy articulates the process by which GTA responsibilities are established, and possible courses of action when stakeholders deviate from agreements.

2. Scope

This policy applies to:

- Currently registered graduate students at the University who are performing duties which form a part of a TA;
- Instructors who oversee the activities of the GTA in relation to the TA; and
- Those who are responsible for course and TA administration (including faculty and staff).

2.1. The policy does not extend to any form of graduate funding other than TAs.

2.2. Students are encouraged to discuss with their supervisor(s), departments, or programs the possibility of and limits to holding a TA concurrent with other funding. If a conflict arises between this policy and the requirements of a funding agency (e.g., Tri-Agency), the requirements of the funding agency will apply.

3. Legal Framework

In addition to the above-mentioned "Related Policies, Guidelines and Procedures", the Policy will be construed in accordance with all applicable law, including:

- *Accessibility for Ontarians with Disabilities Act*, 2005, S.O. 2005, c.11
- *Employment Standards Act*, 2000, S.O. 2000, c. 41;
- *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31
- *Human Rights Code*, R.S.O. 1990, c. H.19;
- *Occupational Health and Safety Act*, R.S.O. 1990, c. O1;
- *Workplace Safety and Insurance Act*, 1997, S.O. 1997, c. 16.

If any applicable legal provisions are modified, abrogated, superseded, or added to, the Policy will be interpreted in accordance with the new legal framework.

4. Purpose

This policy establishes:

- the principles that govern the relationship between Instructors and GTAs;
- the roles and responsibilities of:
  - the University;
  - those responsible for the administration of teaching assistantships at the departmental level (typically the Chair or their delegate, commonly the Graduate Officer) or at the faculty level (typically a person delegated this responsibility by the Dean of the Faculty) (TA Administrators);
  - GTAs; and
  - Instructors
- the expectations of these stakeholders related to:
  - communicating GTA opportunities;
  - selecting and appointing GTAs;
  - identifying necessary and recommended training and other steps required to prepare for a successful TA;

- establishing and communicating expectations prior to the commencement of the TA through a formal agreement;
- fostering bidirectional communications of feedback on performance and consistency with articulated expectations (GTA to Instructor; Instructor to GTA) during the GTA Appointment;

- the processes to be followed to resolve disputes.

5. Principles

This policy is guided by the following principles:

- All members of the University community have a shared responsibility to create and to contribute to a healthy and safe working environment.
- Collegial, frequent, and recurring communication is key to a successful TA, and should include constructive feedback from GTAs, Instructors, students and peers during and at the completion of the TA.
- A reasonable amount of flexibility may be necessary in order to meet the needs of the GTA, the Instructor, and the University.
- It is in the best interests of all parties to address concerns arising out of the TA early, informally, and in a timely fashion where possible.
- The University is committed to allow difficult conversations to take place safely and with support from all appropriate stakeholders, and ensuring due process in resolving concerns without fear of reprisal.
- Where good faith efforts to come to a resolution are not successful, formal processes as described herein are available.

6. Roles and Responsibilities

6.1. The University

The University, through its various administrators and governance committees, has the following responsibilities:

- The University will review minimum rates of pay for GTA activities annually and publish those minimum rates.
- The University will require, and where possible provide the necessary training to support the development and advancement of GTAs in a manner that acknowledges a shared responsibility between the GTA and the Instructor for delivering the academic mission of the University.
- The University will require transparency and fairness in the application and hiring processes for GTA activities.
- The University will require that the terms of a graduate student's appointment as a GTA including start and end dates, total hours of commitment, rate of pay, and other information specified in Appendix B, is communicated to the GTA in writing (the Letter of Appointment).
- The University will require the development of clear and reasonable expectations and terms of agreement for each GTA assignment as specified in Appendix C (the Agreement).
- The University will facilitate and engage in conversations through which concerns from students or GTAs about stakeholders' activities, including TA Administrators and Instructors, can be received.
- The University will take actions, as necessary and appropriate, to resolve students' and GTAs' concerns in ways that acknowledge the power imbalance that exists and protects the students or GTAs from reprisal.

6.2. The TA Administrator

The administration of TAs may be overseen by various organizational units at the University, typically at the department level but in some instances by a body delegated at the Faculty level. The term TA Administrator is used to generalize the application of those responsibilities to disparate groups.

TA Administrators, those responsible for the administration of GTAs, have the following responsibilities:

- to communicate the necessary skills for students to qualify to serve as a GTA and to identify and, in some cases, provide the necessary training. This may include mandatory health and safety training or academic elements unique to the delivery of the course.
- to ensure that GTAs have access to a suitable description of course content, ideally through a current course outline, previous Agreements, or through an articulation of course-specific GTA expectations before selection or appointment to a TA;
- to appoint a GTA whose knowledge and skill set are reasonably appropriate for the course to be delivered;
- to make transparent to students and Instructors the criteria – predominantly a matching of students' knowledge, skills and competencies to those needed for course delivery – on which GTAs are evaluated and appointed to a TA;
- to ensure the completion and distribution of the required Letter of Appointment (Appendix B) and to retain that Letter of Appointment for the duration of the term;
- to ensure the completion of the required Agreement (Appendix C) between the Instructor and the GTA and to retain that Agreement for the duration of the term; and
- to oversee the conduct of end-of-term evaluations of GTA performance, to ensure that the results of those evaluations are communicated to the GTA, and to retain that evaluation for use in future TA appointment processes.

During the course delivery, the TA Administrator or their delegate has the following responsibilities:

- to be a resource, in conjunction with the Instructor, for GTAs who seek to improve their performance throughout the term;
- to be the first point of contact for GTAs, Instructors or course support personnel if conflicts involving the GTA arise, and when appropriate, to take action under the appropriate University Policy; and
- to help support the GTA in the development of a plan to improve performance as a GTA when the evaluation warrants.

6.3. Graduate Teaching Assistants

GTAs have the following responsibilities:

- to have completed all training, as required, to qualify to serve as a GTA, including mandatory health and safety training or other academic elements necessary for the course delivery;
- to review the articulated course content, expectations and skills necessary for courses for which GTA opportunities exist, and to identify those TAs for which GTAs believe they are best suited to serve as a GTA;
- to identify and communicate in a timely way to the Instructor and/or the TA Administrator potential gaps in knowledge or skill sets, allowing for the creation of a collectively agreed upon plan that articulates the responsibilities for acquiring the necessary knowledge and skill sets or an alternative GTA appointment, if available;
- to fulfil the duties outlined in the Agreement;

- to develop strategies with the Instructor to ensure appropriate course support when the GTA is unavailable due to agreed upon absences – including those identified during the appointment process and those that arise during the term;
- to seek feedback regularly on their performance from the Instructor and take steps necessary to improve;
- to provide timely feedback to the Instructor related to the agreed upon expectations including time dedicated to completing GTA responsibilities;
- to manage their time, balancing these responsibilities with sufficient attention to their own academic progression towards degree completion; and
- to reflect upon their performance as a GTA and the feedback received and, based on this reflection, to develop and implement strategies for improvement where necessary.

6.4. Instructors or Instructional Coordinators

Instructors or Instructional Coordinators have the following responsibilities:

- in preparation of GTA selection or appointment, to provide a clear articulation of the course content, necessary knowledge base, and typical GTA expectations to the TA Administrator who shall then make this information available to graduate students;
- when considering the GTA appointment, to engage in communications with the GTA regarding the specific expectations for the course – both academic and procedural – and have those expectations documented in the Agreement (Appendix C);
- to ensure that the GTA has sufficient resources available to complete their duties;
- to evaluate the GTA's performance during the term providing ongoing, timely, and constructive feedback; and
- to provide a summative evaluation of the GTA's performance at the end of the term.

7. Process of Appointing Graduate Teaching Assistants

7.1. Publishing TA Opportunities

TA Administrators shall make all reasonable efforts to provide students with the list of courses for which TAs will be available for the upcoming term, consistent with the requirements outlined in section 6, above. There is a benefit to students to have, as possible, the TA appointment process completed early. To this end, a suggested timeline by which appointments should be made is included in Appendix D.

7.2. Appointing TAs

TA Administrators will make all reasonable efforts to appoint GTAs to TAs upon consideration of the following criteria:

- the need to deliver the courses as determined by the offering units;
- the match of GTA skill sets to course requirements, ensuring that the method by which this matching occurs is transparent to the students;
- obligations for graduate student financial support;
- graduate students' academic obligations that may occur during the term; e.g., comprehensive exams, field work, or conference presentations;
- input from Instructors;
- past performances as a GTA, including recurring or exceptional cases of unsatisfactory performance in TAs by a GTA, including the contravention of University policy or procedures; and
- other criteria when they are consistent with the principles of this policy and are clearly communicated to all parties.

As noted in Section 1, TAs are key components of delivering high quality academic experiences for students. Acknowledging this, recurring or exceptional cases of unsatisfactory performance by the GTA can result in the GTA being precluded from serving as a GTA in subsequent terms, forfeiture of GTA funding, and loss of guaranteed minimum funding. These decisions can supersede the commitments made to the GTA in their letters of admission. See Section 9.3.

The choice between appointing undergraduate or GTAs shall be made based on pedagogy and shall not be made on the cost incurred by the unit, acknowledging that situations will arise in which an insufficient number of GTAs may be available or when undergraduate students may be best equipped pedagogically to serve as TAs.

7.3. Failure to Respond

When a graduate student fails to respond to an offer to serve as a GTA within the time limits established by the offering unit, the graduate student shall be considered to have declined the appointment and interpreted as the graduate student forgoing the funding opportunity. In cases where it is determined that a graduate student has foregone the funding opportunity, this outcome supersedes the funding commitment made to students in their Offer of Admission.
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7.4. Declined Offers

Graduate students who are considering declining an offer to serve as a GTA should understand the financial implications of that decision. In some cases, declining a GTA opportunity may be considered as the graduate student having foregone the funding opportunity that will result in a revision to the funding articulated in the student's Offer of Admission. Graduate students who decline a GTA shall convey their decisions in writing to the TA Administrator and to their supervisor(s). In the situation where the declining of an offer to serve as a GTA results in a revision to a student's funding, that outcome shall be communicated in writing to the student. See Section 7.6.2.

7.5. Letter of Appointment

GTA appointments shall be communicated to the graduate student in writing. Required elements of the Letter of Appointment are included in Appendix B.

7.6. Troubleshooting

7.6.1. Reassignments

In cases where a graduate student is appointed to a TA for which they perceive themselves to be unsuited, the student shall make this concern known to the TA Administrator in a timely way. Given the joint purposes of GTA appointments (to provide learning opportunities for students and to help deliver the University's academic mission), all parties shall engage in efforts to support the GTA in gaining the necessary skills and knowledge to support the course delivery. When possible, consideration may be given to the reassignment of students to alternate TAs at the discretion of the TA Administrator.

7.6.2. Declined or Discontinued Appointments

There may be instances in which a GTA is not able to accept or complete their duties during a term due to health limitations, personal situations, or other reasons that warrant consideration from the TA Administrators and Instructors. In these situations, GTAs may seek alternative arrangements including rescheduling a forthcoming TA Appointment, temporary leaves from an existing TA, or a discontinuation of an existing TA.

In the instances where it is the GTA's health that is a concern, the GTA is encouraged to engage the University resources that support the confidential treatment of medical documentation and assessment for accommodations. The appropriate resolution shall involve a discussion among the

GTA, the GTA's supervisor, the Instructor (if known), and the TA Administrator considering the student's well-being, including their financial support and their academic progression.

7.7. Recourse for GTAs

Decisions on if and how to address the GTA's situation are at the discretion of the TA Administrator. If a GTA believes that a decision of a University authority or the action of a faculty member or staff member of the University related to the TA has been unfair or unreasonable, the GTA may file a grievance in accordance with the procedures set out in Policy 70 – Student Petitions and Grievances. Alternatively, if a GTA believes that they have extenuating circumstances that warrant exceptions from the decisions made in regard to the TA process, the GTA may petition that decision under Policy 70.

8. Content and Handling of the Agreement between a GTA and an Instructor

8.1 The Agreement

An Agreement (Appendix C) shall be established and executed for all GTA appointments. The purpose of the Agreement is to establish clear expectations of all parties in areas including time commitments, contributions to course delivery, and appropriate levels of responsiveness.

For each item contained in the Agreement, the Instructor and the GTA shall agree if the element is mandatory, recommended, or optional; and the Instructor and the GTA, when appropriate, shall establish estimated time requirements for each element. The content of the Agreement may change when necessary, but shall be discussed between the GTA and the Instructor prior to the changes becoming a requirement.

8.2 Hours

Unless specifically stated in the Letter of Appointment, GTAs shall not, , be required to allocate more than 10 hours per week on average to their TA responsibilities.

The Agreement shall directly address the treatment of scenarios when the GTA's actual total time commitment is substantively less than the maximum or exceeds the maximum. Potential resolutions for the former case include identifying additional duties related to the course or the offering unit (e.g., proctoring exams in courses other than the assigned course). In the latter case, GTAs are expected to provide regular updates to Instructors on the GTA's progress in terms of hours committed relative to expectations. If the GTA and the Instructor project that the GTA may approach or exceed the maximum hours, then possible resolutions may include reduced responsibilities for the GTA or increased financial support to reflect actual contributions as agreed upon on a case-by-case basis. In these cases, the Instructor and the GTA are encouraged to consult with the TA Administrator.

8.3 Training

Often GTAs are expected to engage in training or learning exercises to support the preparedness for the TA. In cases where the learning outcomes of these requirement have value beyond the course, then time dedicated to these activities shall not be considered part of the term allotment. If the training or learning is uniquely applicable to the TA, and has limited value outside of the course, then the time dedicated to those activities shall be considered as part of the course allotment. Disagreements on the value of training and its eligibility for compensation between the GTA and the TA Administrator should be resolved collegially. Where this is not possible, the TA Administrator shall decide. Mandatory and recommended elements of the Agreement are listed in Appendix C of this policy. These expectations will normally be established in writing not later than five business days prior to the first course meeting and agreed upon not later than the first course meeting.

9. Dispute Resolution

The University is committed to the following:

- GTAs have the right to question decisions, in confidence and without reprisal or fear of reprisal.
- Real and perceived power imbalances should be considered in any process under this policy.
- Questions, concerns, and debate are healthy and encouraged.
- Collegial and on-going communication is key to the success of the TA.
- It is in the best interests of all to address concerns in good faith, informally, and in a timely manner.
- Timeliness is especially important in circumstances that affect the present-time delivery of course offerings; however, longer term impacts of present decisions remain important considerations when resolving disputes.
- A complainant has the right to proceed formally if the informal process proves unsuccessful or to bypass the informal stage and proceed directly to the formal stage.
- Outcomes that result from the dispute resolution process articulated here may be grieved under Policy 70. See section 9.5.
- Every party to any dispute resolution process will hold all matters in confidence and conduct themselves in a professional manner.
- Resources are available to assist in the resolution of the process.

9.1. Advice and Support

At any stage of the process, the parties to the Agreement are entitled to receive the assistance of, and may be accompanied by, a support person of their choosing. The role of the support person is to provide moral and emotional support; for students, the support person is typically a fellow student, a member of the Graduate Student Association (GSA), a friend, or family member. The support person has no official role or standing in the process.

In addition, the GSA can often provide advice, guidance and support; the GSA may also facilitate communication between the GTA and other stakeholders.

Parties to the Agreement may consult a lawyer for advice, but lawyers will not play an active role in the process. Anyone has the right to start a legal action. However, if a party starts legal action or takes the issue to an external agency (e.g., the Ontario Human Rights Commission), the process under this policy may cease.

9.2. Informal Processes

9.2.1. Discussion between the GTA and the Instructor

Where a dispute arises between the GTA and the Instructor, a conversation between the parties should be the first step towards resolution. Concern may arise from misinformation or a lack of understanding, an action that has been based on incorrect facts, or an action/decision that is inappropriate and should be modified, all of which can be addressed informally. The informal resolution process should be guided by the terms of the Agreement.

Possible outcomes of this informal stage are:

- a resolution of the dispute to the satisfaction of the GTA and the Instructor that includes an updating of the Agreement to reflect revised future expectations; or
- a conclusion that some other method of resolving the issue should be pursued (e.g., addressing the matter under another appropriate policy, or moving to the next level of resolution).

An Instructor may not terminate a TA appointment as a result of the informal resolution process.

If a resolution is not reached, or if this informal process described above is bypassed, the TA Administrator should be engaged to assist with the efforts towards resolution.

9.2.2. Discussion with TA Administrator

This phase is initiated by the GTA or Instructor expressing concerns to those responsible for the administration of TAs. When the concern involves activities of the Instructor, this process may include conversations with, and input and direction from, the person to whom the Instructor reports, normally the Chair or delegate (usually the Graduate Officer) from the unit in which the course is being offered. The communication may be oral or written and must relay the outcome from the Discussions between the GTA and the Instructor, or the reason why that process has not been pursued.

The TA Administrator will meet with the GTA and Instructor to discuss the concern and attempt resolution. Possible outcomes of this informal stage are: a resolution of the dispute to the satisfaction of the GTA and the Instructor that may include an updating of the Agreement to reflect revised future expectations; an agreement that some other method of resolving the issue should be pursued; or the termination of the TA appointment.

If the situation arises where an Instructor's ability to deliver the course is negatively impacted by the dispute resolution process, the GTA's responsibilities may be suspended, with pay, while a mediation or formal resolution takes place. The TA Administrator may appoint an interim GTA to support the course instruction, as necessary.

9.2.3. Mediation

Involvement of a third-party mediator may be useful in helping the parties to resolve the issue. Mediation requires that the parties to the Agreement agree to the involvement of a third party. Trained mediators can be accessed through the Conflict Management & Human Rights Office and Human Resources. Possible outcomes from Mediation are the same as those articulated in 9.2.2.

Where estimated timelines are sufficiently long that the Instructor's ability to deliver the course may be impacted, the GTA's responsibilities may be suspended with pay, pending the outcome. In these circumstances, the TA Administrator may appoint interim GTA(s) to support course instruction as necessary.

9.3. Formal Process

Where the discussion and/or mediation phases have not resulted in a resolution, or where those phases have been bypassed, the GTA or the Instructor has the right to request that the issue proceed

through a formal process as described in this Policy. The formal process is informed by the principles of natural justice, ensuring fairness and due process. The Decision Maker in the formal process is the Dean of the Faculty (or their delegate) in which the course that is the subject of the TA is being offered (the Decision Maker). Acknowledging the power differential between GTAs and Instructors, GTAs can enter into the formal dispute resolution process with a certainty that its processes will be treated as confidential and without fear of reprisal.

Time Limits
Timeliness is critical to the fair disposition of disputes.

The complainant must start the formal stage within 10 working days of the either the event or determination that previous attempts at resolution have been unsuccessful.

Where either party fails to submit documents as required, a decision may be rendered without receiving such documents.

If a party is not able to deliver its materials by the deadlines as required, the party may request an extension of time. The request shall be made in writing to the Decision Maker prior to the specified deadline and will include the reasons for the requested extension and the length of the extension sought.

The Decision Maker may alter any time limit established in this procedure. In deciding whether to grant an extension, the Decision Maker will consider the adequacy of the reasons given for the extension and any prejudice that may result from an extension. If an extension of time is granted to one party, the Decision Maker will inform all parties.

Where estimated timelines are sufficiently long that the Instructor's ability to deliver the course may be impacted, the GTA's responsibilities may be suspended with pay, pending the outcome. In these circumstances, the TA Administrator may appoint interim GTA(s) to support course instruction as necessary.

Submission of Documents
Documents referred to in this procedure may be delivered personally or by email and must provide current and accurate contact information.

The formal process is initiated upon delivery of a complaint to the Decision Maker. The complaint must contain:

- a copy of the Agreement;
- an explanation of the event(s) leading to the dispute;
- the components of the Agreement, this Policy, or professional standards that are not being met;
- a description of attempt(s) at an informal resolution, or an explanation as to why the informal process is not possible in the circumstances;
- the outcome sought;
- the names of any potential witnesses and a summary of what they are expected to report;
- the name of any accompanying support person; and
- all supporting documents/evidence available to assist the Decision Maker.

In any instance where the GTA's health is a concern, the GTA is encouraged to engage the University resources that support the confidential treatment of medical documentation.

Within five business days of the receipt of the complaint, the complaint will be shared with the responding party, and the responding party will be asked to submit a reply which will include:

- an explanation of event(s) leading to the dispute;
- the preferred outcome;
- the names of any potential witnesses and a summary of what they are expected to report;
- the name of any accompanying support person; and
- all supporting documents/evidence available to assist the Decision Maker.

Within five business days of the receipt of the reply, the reply will be shared with the complainant.

Based on the information provided, the Decision Maker will either:

a. request additional information from the parties, the witnesses listed by the parties, or any other source, until the Decision Maker has sufficient information to make a decision; or
b. will render a decision.

Decisions (including reasons for the decision) will be sent to the parties and University departments with a legitimate need to know within ten days of the close of submissions.

Potential Outcomes

In determining the potential outcome, the Decision Maker will consider the following:

- immediate needs, including those of the GTA, the Instructor, and the students in the course in question, among others;
- long-term solutions to new or ongoing issues identified through the dispute resolution process; and
- the importance of relationships in the TA environment, and reasonable efforts that should be made to repair damaged relationships (where applicable and possible).

The chair or TA Administrator may be consulted to assist in the determination of the best possible path forward in the circumstances, considering the needs of the department or offering unit.

Possible outcomes of the formal resolution stage are: a resolution of the dispute to the satisfaction of the GTA and the Instructor that may include an updating of the Agreement to reflect revised future expectations or the termination of the TA appointment.

9.4. Impacts of a Suspended or Terminated TA appointment

In instances where a TA appointment is suspended pending resolution of dispute between the GTA and the Instructor, the following outcomes are possible:

- If the term of the original appointment is reached (i.e., the academic term has completed) while the dispute remains unresolved, then the funding support to the GTA shall be deemed to have been met. In this case, the dispute resolution processes may also be terminated with the agreement of both the GTA and the Instructor. If either party wishes for the dispute resolution to continue, the processes shall be followed to completion.
- If at the completion of the dispute resolution process, it has been determined that the GTA has met the expectations of the Agreement:

    - The GTA shall receive (or have received) the full compensation articulated in the Letter of Appointment;
    - At the Instructor's discretion, the GTA may be reinstated to the current course;
    - The end of term evaluation of the GTA provided by the Instructor shall not reference elements of the dispute that may be considered prejudicial to the GTA, with negative impacts on the possibility of future TA opportunities.
- If, at the completion of the dispute resolution process, it has been determined that the GTA has failed to meet the expectations of the Agreement:
    - The TA Administrator in consultation with the Instructor shall decide whether to terminate the TA appointment or to extend the GTA's suspension until the completion of the term of Appointment.
    - The Instructor may provide summative feedback on the GTA's performance related to the unmet expectations that may be considered in possible future appointments for the GTA.
    - If, in the judgement of the TA Administrator, the GTA's performance or actions in the course that resulted in termination constitute a violation of University policy, or rise to a level of concern that deem the GTA to be unfit for future appointments, this decision shall be communicated in writing to the GTA and their supervisor within five days of the decision being reached. In this case, the decision to preclude future TA opportunities supersedes previous funding commitments including those in the Offer of Admission.

9.5. Grievances

If a GTA believes that a decision of a University authority or the action of a faculty member or staff member of the University related to the TA has been unfair or unreasonable, the GTA may file a grievance in accordance with the procedures set out in Policy 70 – Student Petitions and Grievances. Reinstatement to a TA that has been terminated through the formal process described above is not a potential outcome from a grievance, but other remedies may be available.

Appendix A
Definitions

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

"**Agreement**" means the agreement between the GTA and Instructor on the elements of the course that the GTA is responsible for and the hours that will be dedicated to each task (Appendix C).

"**Decision Maker**" means the Dean of the Faculty (or delegate) in which the TA is based.

"**Graduate Teaching Assistant**" or GTA means a graduate student who has been appointed to be a teaching assistant for a course.

"Instructor" means the individual(s) who is responsible for leading the administration and delivery of course material. The Instructor establishes responsibilities for GTAs in ways that are consistent with the principles articulated in this Policy. Instructors can include regular faculty, sessional, as well as instructional and technical staff, as appropriate.

"Instructional Coordinators" are those who are responsible for leading the administration and delivery of courses with multiple Instructors, instructional support staff, and multiple GTAs, with diverse responsibilities.

"**Letter of Appointment**" is the document from the TA Administrator to the GTA that specifies the course to which the GTA is assigned, the total hours allocated to the GTA for the term, the hourly rate of support, and other administrative items, as appropriate. See Appendix B.

"**Offer of Admission**" means the document that a graduate student receives at the time of admission that specifies, among other items, the funding levels and methods that reflect the University's commitments and the conditions under which those funding commitments may change.

"**TA Administrator**" means the person responsible for the administration of teaching assistantships at the departmental level (typically the Chair or their delegate, commonly the Graduate Officer) or at the Faculty level (typically a person delegated this responsibility by the Dean of the Faculty).

"Teaching Assistantships" or TAs means a position typically provided to graduate students in recognition of their support in delivering the educational mission of the University, including course/laboratory/tutorial material. In some cases, TAs may be part of a student's funding commitment from the University articulated in the Offer of Admission.

Appendix B
Elements in a Letter of Appointment

The Letter of Appointment must contain the following information:

- That Policy 30, which can be found at the Secretariat's website, governs the TA.
- The start and end dates of TA.
- The hours expected per week for a TA, not to exceed 10 hours per week on average.
- The financial support for the term resulting from the GTA.
- The requirement that the Instructor meet and discuss with the GTA student to complete a Graduate Teaching Assistantship Agreement, which will form part of the teaching assistantship appointment.
- The general criteria used in selecting graduate students as GTAs, should be either directly indicated in the letter or provided on a website with the appropriate link in the letter (see sections 6 and 7 of Policy 30).
- That the TA offer is subject to the maintenance of satisfactory academic standing in the graduate program, as defined in the Graduate Studies Calendar, and on satisfactory completion of the assigned duties of the TA.
- That the offer is expressly contingent upon the University receiving regular confirmation, if required by Service Canada, of the GTA's continuing eligibility for employment in Canada. Loss of either "confirmation," if required by Service Canada or Immigration Refugees and Citizenship Canada (IRCC) status (i.e., work permit and/or permanent residence) will render the appointment null and void.
- Failure to engage in the TA by the appointment start date may result in its termination without further notification.
- That the Centre for Teaching Excellence (CTE) is a resource for learning teaching strategies.
- That the Graduate Student Association (GSA) is a support resource for GTAs.
- The following text that addresses the University's information and privacy practices:

  Under the Authority of the University of Waterloo Act (1972), the University processes information – including personal information recorded about an identifiable individual – for the purposes of operating the programs and business functions of the University. This collection, use, disclosure, retention, and destruction of information is done in compliance with (1) applicable Ontario and Canadian federal privacy legislation (e.g., Freedom of Information and Protection of Privacy Act, Personal Health Information Protection Act, Personal Information Protection and Electronic Documents Act), as well as in accordance with (2) University of Waterloo policy and guidelines regarding privacy (e.g., Policy 46, Notice of Collection, website privacy statement). Learn more about University of Waterloo Information and Privacy. For further information regarding the collection, use, and disclosure of personal information of a GPA, contact Graduate Studies and Postdoctoral Affairs. Questions about information and privacy more broadly at the University should be directed to the Privacy Officer at fippa@uwaterloo.ca.

Appendix C

Elements in a Graduate Teaching Assistant Agreement
Between GTA and Instructor of the course

The following elements shall be contained in the Agreement:

- Expectations regarding class attendance;
- Expectations regarding delivering course content during regular course meetings;
- Expectations regarding exam proctoring – including midterm(s) and finals;
- An estimate of the number of elements that require marking, the extent and type of feedback to be provided, and the timeframe for completing the marking and communicating results to students;
- Expectations for the timeliness of email responses, in-person communications, posting to discussion boards on e-platforms, etc.;
- Expectations regarding meetings with the Instructor – frequency and duration of communications; and
- Expectations around confidentiality and professional conduct.
- The University's commitment to allow difficult conversations to take place safely and with support, due process, with references to Policy 30.

The following elements are recommended for inclusion in the Agreement, as applicable to the nature of the course being delivered.

- Expectations regarding leading or participating in tutorials – roles, number and duration;
- Expectations regarding leading or attending labs – roles, number and duration;
- Expectations regarding populating and monitoring online learning platforms – roles and responsibilities;
- Expectations regarding supporting the Instructor in the development of assignments – solving/confirming/generating solutions;
- Expectations regarding participation in field work or experiential learning support including timing and hazards; and
- Other duties in support of the department/unit.

"**Expectations**" include responsibilities assigned to the Graduate Teaching Assistant under section 6 and section 8 of the policy.

Appendix D

Dates of Appointment:

The dates by which appointments are made shall be clearly communicated to students and will normally be guided by the completion of the undergraduate course selection periods. For continuing graduate students, the Letter of Appointment should be delivered as near to the following dates as possible:

15 August for Fall Term (September)
15 December for Winter Term (January)
15 April for Spring Term (May)

For newly admitted graduate students (those beginning their programs), academic units are encouraged to begin the appointment process as early as possible.

Two-Year Progress Report
Global Governance (MA)
June 2021

Background

The Master of Arts in Global Governance program (MAGG) is a multidisciplinary program that draws on the core disciplines of Political Science, History, and Economics, as well as complementary disciplines such as Environment, Resources and Sustainability, and Sociology. MAGG is one of three academic programs housed at the Balsillie School of International Affairs (BSIA), an institute for advanced research, education, and outreach in the fields of global governance and international public policy.

The Final Assessment of the MAGG program's 2017 cyclical review was completed in August 2018. The "summary of key findings" from the external reviewers' assessment was the following:

The MAGG is a world-class program in overall good standing. It boasts a superb complement of faculty, including many world-class scholars as well as a large number of strong, younger emerging scholars. The research capacity of the faculty in this program is first rate, and the evolution of the research profiles of those connected to the program speaks to what we see as the enduring as well as timely challenges of global governance. The student body is also outstanding, and happily the application numbers are robust. The curriculum of the program is entirely appropriate to the field of global governance studies, and the experience of faculty in delivering it and of students in learning about the field is wholly satisfactory. Finally, the facilities are exceptional, and the funding provided by the program to its students is among the best for a program of its kind in Canada. This program adds real value to the University of Waterloo.

Progress on Implementation Plan

Recommendations

1. **Curriculum**

1.1 *Consider adding a methodological requirement*.

Status: **Completed**
Details: The reviewers suggested that the program add a required methods course. The program respectfully disagrees with this recommendation for a number of reasons. First

and foremost, the MAGG is an interdisciplinary program that draws on multiple disciplines, all of which have their own particular methodological approaches to research. To incorporate all of these approaches into one 12-week course would not do justice to any one of the approaches, and would be of questionable value pedagogically. As such, the program directorship believes that students who wish to have methodological training in a particular discipline would be better served by taking a methods course offered by the program's partner departments. Moreover, students are already required to complete political science, history, and economics requirements, as well as a core course in global governance, which provides an overview of the field of global governance. Adding a mandatory required methods course would mean that five of the six courses in the program are required courses, thereby limiting students' elective options and potentially negatively affecting our future enrollment. However, the directorship of the program agrees that, on a case-by-case basis, students may take a methods course offered by partner departments.

1.2 *Examine core course content overlap*.

Status: **Completed**
Details: In response to concerns that there was a fair amount of overlap between GGOV 600 and HIST 605, the reviewers asked the program to consider merging the two. The program directorship understands that this is neither desirable nor necessary. Instead, the program now allows students to choose from a menu of graduate level History courses.

Eligible courses include but are not limited to:
HIST 605 Global Governance in Historical Perspective
HIST 606 International Development in Historical Perspective
HIST 607 Human Rights in Historical Perspective I
HIST 608 Human Rights in Historical Perspective II
HIST 612 Indigenous Rights and Claims: A Global Perspective
HIST 660 Transnational and Global History: Old Problems and New Directions

Senate Graduate Research Council approved this curricular change in December 2018 and it took effect in Spring 2019.

1.3 *Recalibrate the economics core requirement*.

Status: **Completed**
Details: The program directorship agrees completely with this recommendation. Like with the History requirement, students may now fulfill the economics requirement by taking

either a Global Political Economy or an alternative Economics course from a pre-determined menu of courses.

Eligible courses include but are not limited to:
GGOV 610/PSCI 688/ PACS 630 Governance of Global Economy
GGOV 611/PSCI 686 Emerging Economies in Global Governance
GGOV 613/PSCI 668 The Politics of National Innovation Systems
GGOV 614/PSCI 614 Global Business and Development
GGOV 615/PSCI 615 Global Poverty
GGOV 618 Special Topics in Global Political Economy
GGOV 619 Readings in Global Political Economy
GGOV 621/PSCI 606/ERS 606 Governing Global Food and Agriculture Systems
GGOV 663/PSCI 619 China and Global Governance
PSCI 683 Topics in International Political Economy
ECON 637 Economic Analysis and Global Governance
ECON 631 International Trade
ECON 635 International Trade and Development
ECON 673 Special Topics in Economics

Senate Graduate Research Council approved this curricular change in December 2018 and it took effect in Spring 2019.

1.4 *Reconsider the role of the fields in the program.*

Status: **Completed**
Details: The reviewers noted that the fields in the program do not play a crucial role in the curriculum of the program. While this is true, the fields do give prospective students a sense of the types of issues that are addressed in the program. They do serve a very important role with respect to recruitment. As such, the program remains unchanged in this regard.

1.5 *Specify with more precision processes and benchmarks pertaining to Internship/ Fellowship components of program.*

Status: **Completed**
Details: The Committee noted that the reviewers seem to have conflated the Graduate Fellowship program that is run in partnership with Global Affairs Canada, and internship component of the program. Although students can use their fellowship as their internship, the two are quite separate, and the reviewers' comments only pertain to the fellowship since the students whom they consulted with had only finished one term of course work at the time of the site visit. The Graduate Fellowship Program is an integral part of the

MAGG, and the MAGG program has taken strides to improve all communications pertaining to the Fellowship Program, such as providing more information about the program on the BSIA website.

2. *Communicate availability of and process to register in courses outside the MAGG program. Revisit communication of program requirements, events, processes and deadlines to students in a more systematic fashion*.

   Status: **Completed**
   Details: The program already communicates a great deal with students, including in the summer prior to beginning the program. All students receive a program handbook that contains program requirements in July, along with information about course offerings, including those outside the MAGG program. This information is also easily accessible on the BSIA website. Once in the program, students receive a weekly bulletin listing events and other opportunities. However, good communication is an ongoing issue and the program will strive to have open and clear communication on all matters relating to the program.

3. *Faculty renewal: reconsider governance arrangements and a budgetary model to better enable alignment between financial and programmatic needs of MAGG. Reform here should enable faculty renewal to proceed. Existing arrangements make MAGG an orphan program, and orphan programs rarely survive beyond their initial funding cycle*.

   Status: **In progress**
   Details: Given that Global Governance is a program and not a department, faculty renewal is not something the program has any direct control over. Because the program cannot hire its own faculty, staffing courses and finding suitable supervisors for graduate students is an ongoing challenge. However, since the external examiners submitted their report, we have been able to recruit several new scholars from UW to teach courses for the program, such as Dr. Katherine Bruce-Lockhart in the Department of History, and Dr. Philip Boyle in the Department of Sociology and Legal Studies. We are tremendously grateful for the ongoing support of our partner departments.

   Update: We continue to work with partner departments and have had some success. Since the review was completed, the History department has hired Dr. Katherine Bruce-Lockhart. She visited with BSIA when she was interviewing, and since being hired has become the lead instructor for the MAGG section of HIST 605. Although not a new hire, Dr. Susan Roy, from History, is now a regular contributor to the program. Dr. Andrea Collins from ERS has been added to the MAGG steering committee and will be teaching GGOV 620 Global Environmental Governance in September 2021. Unfortunately, much more needs to be done to support the MAGG program on a sustainable basis as the

current efforts are merely piecemeal. Whenever faculty members take sabbaticals or when they do not have an interest in teaching a global governance related course for whatever reason, it is often very difficult for us to secure replacement courses for the MAGG program.

I believe a strong effort needs to be done to rectify the insecurity of the program due to limited faculty availability. For example, the Provost and respective Deans (such as Arts, Environment) might be in a position to help secure faculty members directly for the MAGG program, which is what the two assessors recommended in their report. In the interim, a 3-year sessional appointment would be helpful.

Explain any circumstances that have altered the original implementation plan:

N/A.

Address any significant developments or initiatives that have arisen since the program review process, or that were not contemplated during the review:

We are constantly trying to improve the MAGG program. Since the final assessment of the program in 2018, we have established a new interdisciplinary field in "Peace Integration," which we will be offering in partnership with four other UW graduate programs (Master of Peace and Conflict Studies, Master of Development Practice, Master of Climate Change, and Master of Science in Public Health and Health Systems). We have also established a pathways program with American University (AU) in Washington, DC, that grants MAGG graduates to advanced standing at AU's School of International Service, the biggest school of international affairs in the United States. Last, we are in the process of creating a co-op stream that would complement the internship stream in the program.

Report on anything else you believe is appropriate to bring to Senate concerning this program:

As mentioned above, the faculty resource issue identified in recommendation 3 is an ongoing issue. Senior administration will have to ensure that the MAGG has the necessary faculty support if it is to remain a world-class program in the future.

Updated Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Curriculum: 1.1 Consider adding a methodological requirement; 1.2 Examine core course content overlap; 1.3 Recalibrate the economics core requirement; 1.4 Reconsider role of fields in program; 1.5 Specify with more precision processes and benchmarks pertaining to Internship/Fellowship components of program.	The program has acted on all five recommendations	Suzan Ilcan, Andrew Thompson, and Maha Eid	Completed in Spring 2019
2.	Communication: communicate availability of and process to register in courses outside the MAGG program. Revisit communication of program requirements, events, processes and deadlines to students in a more systematic fashion.	The program has adopted more robust, regular and systematic communications with students	Suzan Ilcan, Andrew Thompson, and Maha Eid	Completed
3.	Faculty renewal: reconsider governance arrangements and a budgetary model to better enable alignment between financial and programmatic needs of MAGG. Reform here should enable faculty renewal to proceed. Existing arrangements make MAGG an orphan program, and orphan programs rarely survive beyond their initial funding cycle.	This is not something that the program has any direct control over. However, the program will continue to discuss long-term staffing with partner departments	Suzan Ilcan	Ongoing

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

Date of next program review: **2024-25**

Date

Signatures of Approval:

8 July 2021

Chair/Director Date

AFIW Administrative Dean/Head (For AFIW programs only) Date

14 January 2022

Faculty Dean of Arts Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

Associate Vice-President, Academic Date
(For undergraduate and augmented programs)

28 October 2020

Associate Vice-President, Graduate Studies and Postdoctoral Affairs
(For graduate and augmented programs)

Date

Two-Year Progress Report
Theological Studies (MTS)
June 2021

Background

The Master of Theological Studies (MTS) is a conjoint degree of Conrad Grebel (CG) University College and the University of Waterloo. There are three options, or streams, within the degree: coursework, applied studies (each 16 courses), or thesis (8 courses plus thesis). Students may study full-time or part-time. In the Winter 2021 term, there were 38 students in the program.

The program was established on the basis of an agreement signed between the University of Waterloo and Conrad Grebel University College on December 18, 2006. An Abbreviated Review was completed in 2011. A Two-Year Progress Report on the recommendations of that review was approved in 2014.

The timeline of the current review is as follows:

- The Self-study documents were submitted to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs on 18 September 2018.
- The reviewers visited the program 15-16 April 2019.
- Reviewers submitted their report to the Quality Assurance Office on 23 April 2019.
- The MTS program submitted their response on 17 July 2019, together with letters from Grebel Dean Troy Osborne and Dean of Arts Sheila Ager.
- The Final Assessment Report was approved by Senate Graduate and Research Council (SGRC) on 14 September 2020.

Summary of key findings from the external reviewers

"We find the program in overall good standing. Students are closely supervised and mentored throughout the program to ensure that the desired learning outcomes are met. The MTS clearly provides a valuable education for the students in the program through a great deal of flexibility and accommodation to each student's needs… The five full-time faculty teaching in the program are fully qualified and publish well received work in their respective sub-fields."

There were 12 recommendations. In our responses, we addressed the specific recommendations as well as several themes the reviewers identified in the report: the hybrid character of the program, course offerings, program structure and learning outcomes, qualifications of incoming students, hiring adjuncts, and thesis option. In what followers, we only address the specific recommendations and our follow-up actions.

Note: the "Initial Response" to each recommendation includes the original program response, as well as some revision and addition in response to the SGRC reviewer's suggestions on the FAR. This accounts for some repetition.

Progress on Implementation Plan

Recommendation 1. Conrad Grebel (CG) provides clearer communication to students about the nature and need for reading courses (that is, they are rare and only when necessary to address a lacuna in a student's program).

Initial response: Agreed and completed. A message was sent to all students in June 2019 informing them of changes to the procedures for reading courses along the lines suggested above. The Theological Studies (TS) Handbook has been updated to reflect the changes.

Status after two years: completed
Details: This change has had the desired effect. In the six terms since the changed procedures, there have been four reading courses. In the six terms prior to the changed procedures, there were 16 reading courses.

2. CG continues on trajectory toward limiting courses taken at other institutions.

Initial response: We are unclear about whether the reviewers' concern is financial or curricular. As they note, some of the financial concerns have been addressed by excluding courses taken at other institutions from the full-time tuition scholarship. From a curricular perspective, there are good reasons for students to take courses elsewhere (e.g., counselling courses from Martin Luther University College). There is a tension between this recommendation and comments throughout encouraging a greater variety of course offerings.

While we do forego some tuition when students take a course elsewhere, this can be less expensive than hiring additional adjunct instructors.

We will act on this recommendation through the following strategies. We will ensure that students understand that taking courses at other institutions is not a "right," but rather a possibility for which clear pedagogical rationale must be given. Students will need explicit approval of their advisor and the TS Director. Convenience should not be the primary rationale for taking such courses and permission will not normally be given if a similar course exists at Grebel. Proactively, the program will identify and promote very specific courses at other institutions that are consistent with our learning objectives and address clear lacunae in our offerings (such as courses in counselling at Martin Luther University College, online language courses at McMaster Divinity College, and courses in Christian Formation at Anabaptist Mennonite Biblical Seminary.)

We do not believe it should be a goal to have a measurable decline in the number of courses students take elsewhere.

Status after two years: completed
Details: The strategies outlined above inform our current advising practice. There are good curricular reasons for the courses students have taken at other institutions in the past two years.

3. CG continues developing the 2-1 relationship with AMBS so that students in the ministerial track complete an MDiv. It could be worthwhile establishing a 2-1 relationship with other local seminaries.

Response: We agree that this is something that should be pursued, and the program will continue to promote the Anabaptist Mennonite Biblical Seminary (AMBS) MDiv program as a good option for its graduates. Responsibility for promotion and communication rests primarily with the Coordinator of Applied Studies, the faculty member who serves as advisor to all students in the Applied Option. The program believes graduates should be informed and supported should they be interested in this option, but we do not believe the program should be held accountable for whether or not a percentage of students, let alone all students in the Applied option, pursue a particular degree after their MTS. On one level, such a message would undercut the program; the program does not want to communicate to potential students that they need three years of study, but the program only provides them two. We are not an MDiv program. Rather than portray this as a weakness, the program believes it is a strength and an opportunity. Students study in a university environment and also gain practical skills which surveys indicate are good preparation for professional work. The reality is that many graduates are not interested in a three-year degree which may be one reason why they enrolled in this program in the first place. Some may come to recognize a need for further studies, either further professional studies (such as MDiv) or further research-based study (PhD). But the program also believes that the MTS stands on its own as a valuable degree.

However, in terms of exploring new connections, programs that are assessed by Ontario Universities' Quality Assurance process will not be able to accept transfer credits for courses for which a degree has been awarded. However, this may be possible for institutions accredited by the Association of Theological Schools. MTS will explore the possibility of an arrangement with Canadian Mennonite University in Winnipeg that offers numerous "streaming" courses, as well as other programs in Ontario.

Status after two years: completed
Details: A Memorandum of Understanding (MOU) on the pathway for our graduates to complete an MDiv degree at Canadian Mennonite University (CMU) in Winnipeg was developed and signed in January 2020. As noted above, such an agreement is not possible with an institution in Ontario.

We have hosted one exploratory meeting with representatives of AMBS and CMU regarding a course-sharing pilot project on some online/remote courses. Such an initiative would increase the range of courses available to our students and would also introduce our students to faculty members at those institutions.

4. CG strengthens the coordination with faculty and courses in CG's other programs as well as the Religious Studies Graduate Program.

Initial response: There are possibilities for increased coordination with Music and with Peace and Conflict Studies (PACS). Katherine Steiner, a recently hired faculty member in Music and Director of the Church Music and Worship program, has already participated in an MTS administrative group discussion about potential points of intersection. We are exploring with the PACS department what a joint MTS

and MPACS course would entail. There are possibilities for curricular and extra-curricular collaboration between these programs regarding Indigenous-Settler relations.

The UW Religious Studies (RS) graduate program is doctoral-level only and for that reason their courses may not be suitable for some of our students. However, in its focus on religious diversity in Canada, there are points at which greater connection and coordination may be possible. The primarily sociological approach to religion may be a welcome complement to our program's primarily textual approach. One MTS student has taken a graduate RS course for MTS credit and so the precedent for this has been established.

We see potential for collaboration with the UW Department of Classical Studies around the teaching of New Testament Greek. The Directors of MTS and St. Jerome University's Master of Catholic Thought meet regularly in order to discuss their programs and ways of collaborating. We also see potential for a closer relationship with the Toronto School of Theology especially regarding students from one institution taking courses at the other.

Status after two years: completed
Details: We have completed an intentional round of conversation with the programs/departments below, though coordination and collaboration with other departments will always be an ongoing process.
PACS – in Fall 2019, we jointly organized a learning trip for MTS and MPACS students to the Woodland Cultural Centre and Mohawk Residential School. There are opportunities in the future to work together on indigenous-settler and anti-racism initiatives. We have also held various joint social events throughout the past two years. Four MTS students have taken MPACS courses over the past two years. Future aspirations include developing a truly joint MTS-MPACS course.
Music – New Grebel Music faculty member Katherine Steiner, who also directs the undergraduate Church Music and Worship program and teaches two TS courses ("held with" undergraduate courses), has participated in several Theological Studies Administrative Group (TS-AG) meetings. These included discussion about future courses, and supervised experiences in ministry (SEMs, i.e., TS 678 and TS 679) placements for MTS students.
Religious Studies – The UW RS department and WLU Dept of Religion and Culture held a retreat in December 2019 to discuss the future of the joint PhD Program. Two members of the MTS program (who are also RS department members) participated, including the Director. The joint PhD program is seeking more partners across these campuses, including the possibility of some of their students taking MTS courses, which we are open to. Likewise, there is openness to MTS students taking PhD courses.
Classical Studies – We met with representatives of this program in September 2019 as they were developing graduate level language introductory courses in Greek and Latin. These courses have now been approved and are available to our students for credit. One MTS student has taken advantage of this opportunity (Greek) in the 20/21 academic year. In the process of exploring this language option, we also clarified with the Graduate Studies and Postdoctoral Affairs (GSPA) that introductory level language courses, if taught at the graduate level, could be applied for credit in our program. Thus, for example, an introductory Hebrew or Greek course taken at another graduate institution could be transferred for credit in the MTS program.
Catholic Thought – there is now regular communication with the interim Director, on matters of shared concern, including increased communication about course planning and offerings.

5. CG becomes more prescriptive and strategic about elective offerings and increase the core requirements.

Initial response: This refers to both which courses are offered and how students are advised. We agree that we should be strategic about what courses are offered, and with what frequency, and have already been moving in this direction. All required courses (core and required Applied courses) are offered every year. As we note in our report, we have identified the following courses as highly recommended for students in Applied Studies:

- Pastoral Care
- Worship Ritual and Ministry
- Preaching
- Christian Ethics

Since 2015-16, we have succeeded in offering these courses every two years and have concrete plans to continue doing so (including plans to request that our faculty position in Practical Theology become a tenure-track position).

We consistently offer at least two Bible electives and two theology electives each year. Other courses which are in our rotation, and which we plan to offer every two or three years include:

- Teaching the Bible (offered Winter 2018, Winter 2020)
- Personal Spirituality (offered Fall 2018, Fall 2020)
- Indigenous Theologies and Methodologies (offered Spring 2018, Spring 2020)

We will continue to be intentional about how we schedule these courses and be prescriptive in terms of advising.

The reviewers have not specified *how* the core requirements should be increased, nor whether the increase should apply to all options or just to one option such as Applied. Without further information, we are unsure about how to proceed with this particular recommendation. If core requirements were to be increased in the Applied option, we think that the Pastoral Care course would be a candidate. However, if this meant offering the course every year, that would reduce the number of other electives we could make available. We would also be concerned that mandating more courses may have the effect of deterring some students from the Applied option who, perhaps for reasons of schedule or interest, may not want to take an increased number of required courses.

Status after two years: completed
Details: We have determined not to make any changes to the course requirements of the Applied option, or either of the other options. We compiled a list of requirements for other MTS programs in Canada and the U.S. and noted that while a few have as many or more requirements than ours, most have fewer requirements than our Applied option (for which 8 of 16 courses are specific requirements). In her covering letter to the Associate Vice-President of GSPA, the Dean of Arts wrote: “Increasing core

requirements and reducing flexibility is the opposite of the strategy I am currently recommending to our graduate programs, so I'm pleased to see that MTS is not inclined to make this change."

We will continue to use the advising process to encourage students to take the "highly recommended" courses above. In the two years since the review, we have continued to offer each of the four "highly recommended" Applied courses every other year. The curriculum committee will continue to plan accordingly.

We have made a change to the title, course description, and prerequisites for TS 783 (now: Theology and Practice of Leadership), primarily to reframe what remains a required course in the Applied option as an attractive elective for those in other options.

The Practical Theology faculty position was not moved to a tenure track position. However, a full-time definite term contract was signed that extends to 2026. This will enable to us support the Applied Studies option with curricular planning, student advising and support, and course offerings.

6. CG develops the curriculum map as a tool, particularly for adjuncts, and incorporate the learning outcomes that should be met in electives. Course syllabi could be linked to the map so that potential overlap and lacunae among courses become more visible.

Response: In the self-study, Appendix 4 was a map linking the Graduate Degree Level Expectations with the MTS Learning Objectives, and Appendix 5 was a map linking the MTS Learning Objectives with the requirements for each of the three program options, as well as the strongly recommended courses in Applied, and elective courses considered collectives. We interpret the recommendation to be the extension of those existing maps to more courses. We agree that more could be done to orient adjuncts to our learning expectations, though this is a large administrative task. Regular and adjunct faculty will also be expected to make the connections to learning objectives clearer in their own syllabi. The TS Administrative Group (TS-AG) will then compile the results and note any gaps.

Status after two years: completed
Details: Starting in Winter 2020, all instructors have been asked to explicitly link their course objectives with the MTS Learning Objectives on their syllabi. Every term, the Director communicates with adjuncts about learning objectives. The explicit work with adjunct instructors on the integration of program and course objectives may be the most significant development emerging from this recommendation.

In February 2021, the TS-AG examined the learning objectives of 13 courses (including all core and required courses in each option and several key electives) and mapped these with the program objectives. We used a framework in which each course was judged to have made a major, minor, or no contribution to a particular program objective. This exercise confirmed that the program objectives are being met through required and elective courses. It was noted that, in general, TS instructors seek to advance most, or all, of the program objectives in each course. One difference is found in the Applied option, in which some courses are more skills-oriented and others more theoretical.

It was also noted that objectives 5 (issues of justice and peace) & 6 (intercultural competence), while a minor focus of nearly all courses, were not a major focus of any of the courses included in the

curriculum map. This is due in part to the fact that electives such as Theologies of the Global South, Indigenous Theologies, and Peace Church Theology, which all make a major contribution towards those objectives, were not included in the mapping exercise. This exercise highlighted the importance of scheduling these courses on a regular basis.

The limits of this exercise were also noted. It can confirm the correlation of program objectives with course objectives but cannot confirm that a course fulfils the objectives it aspires to fulfil.

Regarding objective 6 (intercultural competence), there is further discussion under recommendation 12 below.

7. CG institutes systematic preparatory work for students without a related degree to be undertaken in the summer prior to entry in the program and substitution for the Old Testament and New Testament courses be allowed when incoming students demonstrate competency.

Initial response: It would be helpful to know more about what kind of preparatory work is most needed or if there are some students who should not have been admitted in the first place. We note that in our survey of current students included in the self-study, only one of 13 indicated that their previous studies did not adequately prepare them for the program. We have designed our core courses in such a way so as to introduce students to graduate studies, to the practices of research and writing, to the critical study of the Bible and theology and history, and to specific content. We also recognize that even though we highly recommend students to take core courses as early as possible, for reasons of student schedule or term of admission, sometimes the sequencing is off. Before we design initiatives to address the needs of what may be a small number of students, we would want to know more about the gaps they identify.

The MTS program is not planning to offer any formal systematic preparatory work in the summer for students entering the program. The MTS does not require that students have previous degrees in theology or religious studies. The four core courses (in all options) plus TS 677 (for Applied option) are designed to provide the foundations necessary for the degree. Practically speaking, we do not have the faculty resources to support additional summer instruction. Requiring formal summer study for some students would mean they would need to be admitted for the Spring term, a change in the basic design of the program that we do not believe is warranted.

Several years ago we developed a reading list that is sent to incoming students over the summer. This list is especially for those who have not studied theology or biblical studies in formal academic settings. This list will be reviewed and enhanced.

We do have in place a procedure for granting advanced standing for any of the four core courses. Advanced standing here means being exempt from one or more core courses, though not reducing the total number of courses required in the program. We will review these procedures, and consider the possibility of a competency exam. We will also revisit the question of whether the onus is on the student to initiate the process (as it is currently) or whether advisors should be proactive in suggesting that students consider this opportunity.

Status after two years: completed

Details: The recommended reading list distributed to incoming students was reviewed and expanded by faculty members. For the cohort that began in Fall 2020, we developed and held a series of three "Welcome sessions." Recognizing the challenges of learning remotely, a key purpose was to develop a sense of community among the students and faculty. These sessions were also opportunities for faculty members to introduce themselves and their areas of study, research, and the methods they use. We will hold at least one such session again for the Fall 2021 cohort. Our students were also encouraged to participate in the "Grad Ready" resources developed by the University.

We revised the Advanced Standing guidelines and process in September 2020, communicated this to students, and updated the TS Handbook. The process includes the possibility of a competency exam, at the discretion of the instructor of the core course for which such standing is sought. The admissions and scholarship subcommittee of the TS-AG has the authority to approve advanced standing after a process that includes discussion with the student, documentation of previous work, consultation with the student's advisor, and consultation with the instructor of the core course in question. The onus rests with the student to learn about and initiate the process, though in cases where an incoming student has substantial background in the field, this might be identified by the Director in the admissions process. In the past year, three students have explored the possibility of advanced standing but in all cases agreed that it made more sense to take the core course in question. In general, because the core courses introduce students to methodologies used throughout the program, and not just "content," we anticipate that advanced standing will be granted rarely.

TS 600 – Thinking Theologically, a core course that most students take in their first semester, now includes an explicit library and research skills component, with assessments, that the instructor delivers with support from the Grebel librarian.

8. CG institutes policies or procedures around the hiring of sessional and adjunct faculty that is driven by the curriculum rather than by individuals.

Initial response: [Note on terminology: according to our policies, we have regular faculty members (typically full-time and often though not always tenure-track) and adjunct faculty members who are hired for one course at a time. We do not use the language of sessional faculty.]

It is already the case that the hiring of adjunct faculty members is driven by the curricular needs of the program. We determine program needs first (often with the assistance of student surveys), and then seek appropriate teaching resources. One of the ongoing challenges is that course planning happens over a year in advance and the needs and interests of particular cohorts can be quite different from year to year. Thus, we recognize that our course offerings do not always meet the needs and interests of students in a given term.

In consultation with the Dean and other program units at Grebel, we will develop written procedures for the hiring and re-hiring of adjunct course instructors.

Status after two years: completed
Details: We developed written guidelines in February 2020. A key element in the process is the establishment of a curriculum committee which consists of members with no financial interest in the

assignment of any particular courses. This committee, which first met December 2020, reviews curricular needs and determines which courses ought to be offered. The teaching assignments of regular faculty are correlated with needs first. Remaining courses will be covered by adjunct instructors. While these guidelines do not assume that a full open search will be conducted for every adjunct position, such a process is always possible. The commitment to a diversity of instructors may at times suggest to the curriculum committee that a particular individual should be invited to teach a course, or that an instructor who has taught a course previously should be offered the opportunity to do so again. Fairness to an instructor who has developed a particular course may also suggest that they should have the opportunity to offer it more than once. Such decisions would be determined by the curriculum committee.

9. CG lays out clearer expectations for the community service load for full-time faculty members and that it be both strategic and limited to helping with student recruitment.

Initial response: We appreciate the recognition that running a program such as this requires a significant commitment on the part of all faculty and staff involved. We also note that while speaking in church constituencies is service work that all TS faculty members do, it is only one aspect. Within the TS program, faculty members are also involved in shared governance, leading extra-curricular workshops, participating in admissions interviews, and administrative work over and above what might be directly compensated through course releases. In addition, as is noted, there are service expectations in relation to Grebel as a whole as well as to other units within the University. Faculty are also involved in service to the guild through editorial boards, professional associations, and peer-review requests. Since our students come from a wide range of Christian traditions, it is not clear to us how we would implement service expectations that were *limited* to MTS student recruitment. Direct recruitment, through visits to other post-secondary schools and one-on-one conversations with potential applicants, is already assigned administratively. If this were the lens through which we understood all of our speaking and teaching in churches, this may actually increase rather than decrease service expectations.

Regular faculty members at Grebel are accountable not to a Chair or Program Director but to the Dean for their research, teaching and service. Overall service expectations of faculty members are thus the responsibility of the Dean to whom we defer for a response to the recommendation.

The program will request of the Dean that the position of Director of Theological Studies be compensated annually with two course releases (as is common for the chairs of departments, in this case the chair is also the graduate officer) rather than the current one course release. The Director of TS is responsible for the MTS program, as well as oversight of the Toronto Mennonite Theological Centre and the Anabaptist Learning Workshop.

Status after two years: in progress
Details: We defer to the Dean in terms of expectations for faculty service.

A written request to the Dean of Grebel that the Director of TS receive two course releases per year was made in July 2019. This request was not approved. Forms of additional compensation may be considered on an ad hoc basis. The Director of TS is also advised to take steps to limit the amount of time they dedicate to the program.

We note that the Anabaptist Learning Workshop, a program for which the TS Director had oversight, concluded in Spring 2020.

10. CG becomes more intentional about hiring sessional lecturers that will diversify the teaching component in the program.

Initial response: We agree and will indeed be more intentional about this. We note that in the last two academic years, three of ten adjunct-taught courses were led by instructors who are persons of colour. We plan to continue to engage those particular instructors if they are available (one has since been hired into a tenure-track position elsewhere) and to actively identify and approach other candidates to teach in the program.

Status after two years: in progress
Details: Increasing the diversity among instructors is a priority for the TS program and for Grebel as an institution. We have continued to offer two courses taught by instructors who are persons of colour—each of these courses will be offered again in the near future (confirmed for Fall 2021 and Spring 2022). The adjunct hiring guidelines (see recommendation 8 above) provide a framework for us to be proactive in initiating contact with a potential adjunct instructor and/or to put out in open call for applications, in order to advance this particular priority. We note that for the upcoming 2021-22 academic year, there are no "unassigned" courses for which new adjuncts could be hired.

11. CG students with U of W degrees serve as guides and mentors to those unfamiliar with the campus. We strongly encourage that a way of facilitating MTS students' identification with the U of W graduate program and students be found.

Initial response: This is a good idea. We can collaborate with MPACS about advancing this recommendation. We will engage in conversation with our students who are UW graduates in order to get a better sense of how this might be implemented.

We want to be modest in our expectations of how much students will identify with the University of Waterloo as a whole and ensure that such efforts do not diminish connections to the graduate community at Grebel. There is a strong identification with Grebel and its community, which we regard as a strength of the program. Such identification mitigates against the isolation that is a danger for many in graduate programs.

Status after two years: completed
Details: In January 2020, TS administrators convened a conversation with all current MTS students who had been undergraduate students at UW to seek their advice on how to best connect MTS students with other parts of the University. These UW grads indicated that they did not perceive there to be a significant problem with current patterns. Grebel provides a solid point of connection and community as well as structured opportunities to meet other graduate students in the MPACS program. However, more could be done to familiarize students to UW programs and services. We note that the Grad Ready initiative is one source of information and resources for new students.

As a result of this meeting, our weekly email newsletter has regularly highlighted specific UW services and opportunities in an "Across the Creek" section (e.g., reminders about AccessAbility Services, Wellness, Health Insurance, Writing and Communication Centre, GSPA and GRADVenture events, Athletics and Recreation). In Fall 2020, we hosted a customized Writing and Communication Centre workshop for our students. Fall orientation (when in person) will include a walking tour of campus. In addition, an MTS student has recently volunteered to serve as council member of the UW Graduate Student Association.

12. CG develops an instrument that allows measurement of development of such things asprofessional identity and intercultural competence.

Initial response: We will explore existing instruments and consider how they might be integrated into the program. Given that students in the Applied Studies option typically take TS 677 Church and Ministry in their first term and TS 783 Integration Seminar in the last or second to last term, these courses may provide opportunities for measuring one kind of professional identity. There may be other ways that we could integrate such instruments in the required courses for all students or as an option for those who are interested. Adding a milestone requirement may be way to ensure that students engage with such instruments.

Status after two years: in progress
Details: We are not aware of the existence of an instrument that measures "professional identity" in a way relevant to (quite diverse) professional interests of our students. We are not aware of a similar academic program, nor of a MDiv program, that uses an instrument for the measurement of "pastoral identity," one plausible specification of a relevant professional identity. A recent doctoral dissertation on the development of pastoral identity[1] made no reference to any such instrument. While the development of professional identities are nurtured in a variety of ways through courses, supervised experiences in ministry (SEMs: TS 678 and TS 679), and the advising process, we will not be using an instrument to measure it.

Regarding intercultural competence, we asked one faculty member and two program staff people to do research on best practices in other similar programs. On the basis of this work, a document outlining eight possible plans of action, with rationales, was presented to the TS-AG for discussion in June 2020. The options are not exclusive. For example, we already seek to integrate intercultural approaches into each course, through readings and guest speakers, and also to offer specific courses with an intercultural focus (such as "Indigenous Theologies"), though of course we can do more of both. However, our discussion at that time suggested that the new initiative we should add is an additional milestone in the program, such as a half-day workshop. While the "measurement" of a learning objective is important, it is secondary to the primary learning itself.

The Black Lives Matter protests in the summer of 2020 highlighted the importance of a more explicit "anti-racist" framework and led us to re-evaluate whether "intercultural competence" is the right lens.
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[1] Biju Chacko, "Developing Pastoral Identity in Level One Clinical Pastoral Education Students at Duke University Hospital, Durham, North Carolina," DMin dissertation (Gardner-Webb University, 2015).

We also understand that a university-wide President's Anti-racism Task Force (PART) may develop a workshop that would be available to students. We might make such a resource a required milestone, or perhaps we would need to develop a more discipline-specific one. However, we will need to wait and see what PART develops.

There are tools available for the measurement of "intercultural competence." The most suitable one we identified (the Intercultural Development Inventory) consists of a 50-item questionnaire that introduces participants to a range of concepts and places them on a continuum. It would cost at least $2000 in order to certify one faculty member to oversee its use in our program. While the cost is not insurmountable, we are not sure where this would be integrated into our program, for example in a milestone for all students, in a core course for all students, or in the sequence for Applied studies students. The challenge of adapting our program during the pandemic has also meant that we have not made as much progress on this recommendation as we would have hoped. However, we pledge to continue to work at this.

Explain any circumstances that have altered the original implementation plan

Obviously the shift to remote teaching and working from home has had an effect on the program as a whole, and has reduced our capacity to focus on the priorities identified in the review. At the same time, the rapid switch to remote teaching has prompted many constructive conversations about pedagogies, teaching formats, and the various ways we can meet our learning objectives. The "flipped classroom" approach will likely shape our teaching even as we return to primarily in-person delivery. At the same time, we may consider developing some remote/online courses as a permanent feature of our program.

Jeremy Bergen's second term as TS Director effectively ends 31 December 2021. After that time, primary responsibility for implementing the "in progress" work identified above will rest with the new Director, Carol Penner.

Updated Implementation Plan

	Recommendations	Proposed Follow-up	Responsibility for Leading and Resourcing (if applicable) Follow-up	Timeline for addressing Recommendation
1.	Conrad Grebel (CG) provides clearer communication to students about the nature and need for reading courses (that is, they are rare and only when necessary to address a lacuna in a student's program).	Program guidelines have been updated and communicated to students.	TS Director	Completed, April 2019
2.	CG continues on trajectory toward limiting courses taken at other institutions.	It is unclear whether the concern is financial or programmatic. We will continue to monitor. There are programmatic reasons for students to take courses elsewhere and this possibility was built into the structure of the program.	TS Director	Completed, May 2021
3.	CG continues developing the 2-1 relationship with AMBS [Anabaptist Mennonite Biblical Seminary] so that students in the ministerial track complete an MDiv [Master of Divinity degree]. It could be worthwhile establishing a 2-1 relationship with other local seminaries.	We will continue to promote the AMBS MDiv option with graduates; and will explore a similar arrangement with a Canadian institution.	TS Director	Completed. MOU with Canadian Mennonite University (CMU) signed January 2020; a similar partnership with Ontario seminary is not possible due to rules against double-counting courses. Current exploratory conversations with AMBS and CMU re. select course-sharing.
4.	CG strengthens the coordination with faculty and courses in CG's other programs as well as the Religious Studies Graduate Program.	We will make connections with RS graduate programs (though differences in level [doctoral] as well	TS Director	Contact with each program completed as of March 2021. Highlights: Classical Studies graduate intro Greek language

		as focus will limit these opportunities), as well as Music, Peace and Conflict Studies, Catholic Thought, Classical Studies.		course now available to MTS students; participated in Dec 2019 Religious Studies grad studies planning retreat; ongoing with Peace and Conflict Studies incl. co-curricular initiatives
5.	CG becomes more prescriptive and strategic about elective offerings and increase the core requirements.	We are unclear about which core requirements should be increased. We have already identified four highly recommended courses for Applied Option and committed to offering them every two years.	TS Director	Completed. No changes to core requirements will be made. Course title and description of TS 783 revised. The "highly recommended" courses have been scheduled to be offered every two years.
6.	CG develops the curriculum map as a tool, particularly for adjuncts, and incorporate the learning outcomes that should be met in electives. Course syllabi could be linked to the map so that potential overlap and lacunae among courses become more visible.	All regular and adjunct faculty will be reminded of program learning objectives and asked to incorporate them into their syllabi.	TS Director	Completed. Instructors advised to incorporate this program objectives into course objectives in syllabi, beginning Winter 2020; TS-AG completed a curriculum mapping exercise February 2021
7.	CG institutes systematic preparatory work for students without a related degree to be undertaken in the summer prior to entry in the program and substitution for the Old Testament and New Testament courses be allowed when incoming students demonstrate competency.	We do not propose remedial workshops for incoming students. We will review how research and writing and other skills are covered in our core courses. We will review and enhance our "summer reading" list. Substitution (advanced standing) for core courses, including Old Testament and New Testament, is already allowed. We will also review our existing procedures for this.	TS Director	Completed. Summer reading lists revised Spring 2020; "Welcome Sessions" held in Spring 2020 and planned for Spring 2021; revised Advanced Standing guidelines implemented September 2020
8.	CG institutes policies or procedures around the hiring of sessional and adjunct faculty that	A procedures document will be developed together with other academic units at Grebel.	TS Director, and Dean of	Completed. Guidelines developed and approved February 2020, to be discussed

	is driven by the curriculum rather than by individuals.		Conrad Grebel	by Academic Advisory Committee; Curriculum Committee first met Dec 2020
9.	CG lays out clearer expectations for the community service load for full-time faculty members and that it be both strategic and limited to helping with student recruitment.	Faculty members are accountable to the Dean, not the Program Director, for service expectations. We will request two-course release for program director.	TS Director, and Dean of Conrad Grebel	Request to Dean for additional course release for director made July 2019 but not approved. Grebel Dean is primarily responsible to respond to the recommendation regarding faculty service load.
10.	CG becomes more intentional about hiring sessional lecturers that will diversify the teaching component in the program.	We will be more intentional about this.	TS Director	In progress. Current adjunct instructors who are persons of colour have been confirmed for 21-22 academic year.
11.	CG students with U of W degrees serve as guides and mentors to those unfamiliar with the campus. We strongly encourage that a way of facilitating MTS students' identification with the U of W graduate program and students be found.	We will consult with UW grads in our program about how best to do this.	TS Director	Completed. Meeting with current MTS students who are UW alumni to discuss ideas, February 2020; suggestions incorporated into weekly newsletters to students. Campus tour planned for future orientation days.
12.	CG develops an instrument that allows measurement of development of such things as professional identity and intercultural competence.	We will examine existing instruments and how we might incorporate them in required courses and/or as options for those interested.	TS Director	In progress. There is no relevant "professional identity" measurement instrument. Research and discussion ongoing about "intercultural competence" or "anti-racism" frameworks, and measurement instruments. Current plans are to develop a new milestone.

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

Date of next program review: **2025-2026**
Date

Signatures of Approval:

Jeremy M. Bergen June 16, 2021

Chair/Director Date

Troy Osborne October 22, 2021

AFIW Administrative Dean/Head (For AFIW programs only) Date

Sheila Ager Digitally signed by Sheila Ager
Date: 2022.01.14 15:24:17
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Faculty Dean Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

Associate Vice-President, Academic
(For undergraduate and augmented programs) Date

21 October 2021

Associate Vice-President, Graduate Studies and Postdoctoral Affairs
(For graduate and augmented programs) Date

MEMORANDUM

To: **Senate Graduate & Research Council**

CC: **Bessma Momani, Interim Associate Vice-President, Interdisciplinary and Sponsored Research**
Bob Lemieux, Dean of Science
Mary Wells, Dean of Engineering
Doug Peers, Dean of Arts
Lili Liu, Dean of Health Sciences
Jean Andrey, Dean of Environment
Kathy Winter, Assistant University Secretary and Privacy Officer

From: **Charmaine B. Dean, Vice-President, Research and International**

Date: **May 2, 2022**

Subject: **Name Change for IC3**

- For decision -

I am pleased to inform you that I am recommending that the Senate Graduate and Research Council review the proposal, and discuss and vote on the name change for the university-level Interdisciplinary Centre for Climate Change.

MEMORANDUM

TO: **Bessma Momani, Interim AVP Interdisciplinary Research and Sponsored Research**

CC: **Jean Andrey, Dean of Environment**
Mark Giesbrecht, Dean of Mathematics
Bob Lemieux, Dean of Science
Lili Liu, Dean of Health
Douglas Peers, (Acting) Dean of Arts
Mary Wells, Dean of Engineering
Kathy Winter, Assistant University Secretary and Privacy Officer

FROM: **Sarah Burch, Executive Director, Interdisciplinary Centre on Climate Change**

DATE: **April 25, 2022**

SUBJECT: **Name Change Request – Interdisciplinary Centre on Climate Change**

Proposal: The Interdisciplinary Centre on Climate Change (IC3) proposes to change its name to the Waterloo Climate Institute.

Rationale: As part of its new strategic plan (2022-26), the Interdisciplinary Centre on Climate Change is seeking a name change that is clearer, more recognizable, and more easily associated with UWaterloo. This change would better support the expected growth of the centre into a nationally and internationally relevant and connected climate change knowledge hub.

IC3 has been a research centre since 2008, and a university research centre since 2018. Climate change research at Waterloo has grown substantially since 2008 along with the urgency of the climate crisis. Since just 2018, IC3 membership has grown from 67 members to over 115 in 2022, and we have seen an increase in external interest in the centre over this same period. Recent successes in securing significant external funding (philanthropic and government) provide real opportunities for Waterloo and IC3 to leverage this deep collective expertise in climate research and expand our impact.

As part of our strategic planning exercise over the past several months, we spoke to a large number of our members, as well as representatives of other university units, who consistently

expressed confusion over the centre's name – including from those who had been members since the centre's inception in 2008. There was broad support, including from our governing board made up of the Deans of all six Faculties and individual faculty representatives, for adopting a new name that would be more easily remembered, and also signify the excellence and breadth of climate research at Waterloo. External collaborators we spoke with across Canada also expressed little recognition of the IC3 name and brand and our affiliation with Waterloo.

A name change timed with the start of a new strategic plan, and at the same time as new research initiatives are being established, would be able to leverage these foundational elements to more quickly build name recognition and a renewed brand in a way that is strongly aligned with our new direction. It would also more clearly connect the centre with Waterloo.

It should be noted that we remain deeply committed to interdisciplinary research, and that interdisciplinarity is rooted in our mission, even if it is no longer in our name.

We have scanned Canadian academic and non-academic climate research centres and institutes, and are confident that the proposed name (Waterloo Climate Institute) is distinctive and would not be confused with other groups. If the requested name change is approved, we plan to work with Creative Services on an updated logo to accompany the new name, and will ensure that this aligns with university branding policies.

UNIVERSITY OF WATERLOO

FACULTY OF ARTS
519-888-4567, ext. 38246
dean@watarts.uwaterloo.ca | uwaterloo.ca/arts

April 19, 2022

Charmaine Dean
Vice-President Research and International
University of Waterloo

RE: Name change for IC3

Dear Professor Dean:

The Faculty of Arts is pleased to support the name change of the Interdisciplinary Centre for Climate Change (IC3) to the Waterloo Climate Institute.

The proposed rationale for a name that more clearly defines the Institute's goals agrees with the image put forward by the Centre in their Strategic Plan. We further concur that the name is sufficiently distinctive and invoking of a strong association with the University, which will support the growth of the institute.

Sincerely,

Douglas Peers
Acting Dean, Faculty of Arts

UNIVERSITY OF WATERLOO

FACULTY OF ENGINEERING | Office of the Dean
519-888-4885
dean.engineering@uwaterloo.ca | uwaterloo.ca/engineering

April 22, 2022
Charmaine Dean
Vice-President Research and International
University of Waterloo

RE: Name change for IC3

Dear Professor Dean:

The Faculty of Engineering is supportive of the name change of the Interdisciplinary Centre for Climate Change (IC3) to the Waterloo Climate Institute.

The proposed rationale for a name that more clearly defines the Institute's goals aligns with the image put forward by the Centre in their Strategic Plan. This name change is clearer, more memorable, and makes the association with Waterloo obvious which will support the growth of the institute.

Sincerely yours,

Mary Wells

Mary Wells
Dean, Faculty of Engineering

April 21, 2022

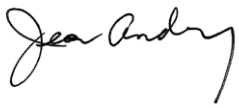
Support for IC3 Name Change

Dear Dr. Dean,

I have been a member and supporter of the Interdisciplinary Centre on Climate Change since its inception. It has been exciting to be part of its evolution.

I fully support the proposed name change.

Sincerely,



Jean Andrey
Dean, Faculty of Environment

UNIVERSITY OF WATERLOO

FACULTY OF HEALTH
519-888-4567, ext. 40710
uwaterloo.ca/health

April 22, 2022

Dr. Charmaine Dean
Vice-President Research and International
University of Waterloo

RE: Name change for IC3

Dear Dr. Dean:

The Faculty of Health is pleased to support the name change of the Interdisciplinary Centre for Climate Change (IC3) to the Waterloo Climate Institute.

The proposed rationale for a name that more clearly defines the Institute's goals agrees with the image put forward by the Centre in their Strategic Plan. We further concur that the name is sufficiently distinctive and invoking of a strong association with the University, which will support the growth of the institute.

Sincerely,

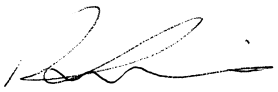
Lili Liu,
Dean, Faculty of Health

UNIVERSITY OF WATERLOO
FACULTY OF SCIENCE

Office of the Dean

TO: Charmaine Dean, VPRI

FROM: Bob Lemieux, Dean of Science



DATE: April 23, 2022

RE: Name change for IC3

The Faculty of Science is pleased to support the name change of the Interdisciplinary Centre for Climate Change (IC3) to the Waterloo Climate Institute.

The proposed rationale for a name that more clearly defines the Institute's goals agrees with the image put forward by the Centre in their Strategic Plan. We further concur that the name is sufficiently distinctive and invoking of a strong association with the University, which will support the growth of the institute.

UNIVERSITY OF WATERLOO

FACULTY OF MATHEMATICS | Office of the Dean
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deanmath@uwaterloo.ca | uwaterloo.ca/math

April 22, 2022

Charmaine Dean
Vice-President, Research and International
University of Waterloo

RE: Name change for IC3

Dear Professor Dean:

The Faculty of Mathematics is pleased to support the name change of the Interdisciplinary Centre for Climate Change (IC3) to the Waterloo Climate Institute.

The name put forward defines the Institute's goals agrees with the goals and aspirations put forward by the Centre in their Strategic Plan. The name is appropriate, distinctive and clearly identifies Waterloo as the host institution.

Your truly,

Mark Giesbrecht

Dean, Faculty of Mathematics.
Professor, David R. Cheriton School of Computer Science
University of Waterloo, Canada
Email: mwg@uwaterloo.ca URL: https://cs.uwaterloo.ca/~mwg

UNIVERSITY OF WATERLOO
FACULTY OF ENGINEERING

M E M O

TO: Kathy Winter, Assistant University Secretary & Privacy Officer Secretariat

FROM: S. Sivoththaman, Associate Dean, Graduate Studies, Faculty of Engineering

RE: Senate Graduate and Research Council

DATE: April 25, 2022

Please place the following motions forward for approval at the next meeting of the SGRC. These changes were approved by the EFC April 19, 2022.

Items for Approval:

1. The department of **Electrical and Computer Engineering** would like to make the following calendar changes
    a. New Graduate Specialization in Business Leadership
        i. Updating the MEng degree requirements to include one new Graduate Specialization in Business Leadership, which requires students to take 4 courses from a specified list as detailed below.
        ii. Increasing the number of required courses for the MEng degree from 8 to 9 or 10 (depending on the requirements associated with the ECE Graduate Specializations) for students completing the Business Leadership Graduate Specialization along with one other ECE Graduate Specialization.
    b. Updating course numbers for some courses associated with the Graduate Specialization in Sustainable Energy.
        i. ECE 760 Topic 10 > ECE 660
        ii. ECE 661 > ECE 761
        iii. ECE 664 > ECE 762
        iv. ECE 667 > ECE 763

c. Adding a direct entry Co-operative program/option to the MEng in Electrical and Computer Engineering program

Rationale for Request:

a. i) The Graduate Specialization has been designed to introduce students to the processes and best practices for leading technical teams, processes, and organizations in a North American business context. The key purpose of leadership is creating a framework for action. Doing this well requires an understanding of people, familiarity with the "language" of business which is finance, and disciplinary expertise. The Graduate Specialization supplements the expertise students develop in the ECE MEng program with the core skills needed to lead a business venture. Note: Students are not expected to have a background in business to take any of the courses

   ii) Currently, MEng students must graduate if they have met their degree requirements after completing 8 courses, because the GSAC currently states that they must do so. If a student wants to complete the Business Leadership Graduate Specialization along with one other ECE Graduate Specialization, which may require 9 or 10 courses, they have to strategically plan their courses, so as not to meet the MEng degree requirements before completing the Graduate Specialization requirements. Increasing the number of courses will provide more flexibility and feasibility for students to pursue the Business Leadership Graduate Specialization and one other Graduate Specialization.

b. This is a compulsory course for MEng in ECE Graduate Specialization in Sustainable Energy and offered on a regular basis; as such, a 600's series number is more appropriate.
   ii) Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.
   iii) Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.
   iv) Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.
c. This will facilitate MEng students in applying the knowledge they gained in their coursework and will help in professional development, networking and developing new collaborations. It aligns with the University's and Province's vision and policy on "Work Integrated Learning." And Benefits in job search and placement of MEng students after completion of their programs. It will attract the best applicants to the MEng in ECE program, as well as to other graduate programs and will allow international students to take up co-op jobs without impacting their Post Graduate Work Permit (PGWP).

2. The department of **Systems Design Engineering** would like to make the following calendar changes
    a. Revision of course SYDE 655

Rationale for Request:

To upgrade the course contents and make it more relevant to recent advanced engineering applications, particularly in the fields of intelligent and autonomous systems, by covering elegant optimal control solution techniques for complex, large-scale, or challenging control problems including systems with unknown and changing dynamics. The course title and description have been revised to reflect major updates to the contents.

3. The department of **Mechanical and Mechatronics Engineering** would like to make the following calendar changes to their MASc and MASc-Nano programs
    a. Add attendance of at least 8 MME research seminars to the MME MASc degree requirements
    b. Remove the MASc seminar from the degree requirements for both the MASc and MASc-Nano and replace it by a MASc thesis oral defence with a committee.

Rationale for Requests:

a. Currently, research seminar attendance is a degree requirement for MASc-Nanotechnology (at least 8) and for MEng in Mechanical and Mechatronics Engineering (at least 4), however no research seminar attendance is currently specified for regular MASc in Mechanical and Mechatronics Engineering. For consistency with existing Master's degrees, it is proposed to add the attendance of at least 8 department research seminars to the degree requirements. This will strengthen the research exposure of MASc students and build a stronger graduate community in the Department of Mechanical and Mechatronics Engineering.

b. Currently, there is no specified format of the research seminar that must be given by MASc students. In practice, the research seminar is given in front of the two thesis readers and supervisor (s) after they received and reviewed the thesis who ask questions about the thesis work. It is proposed to formalize the format of the thesis examination that is already taken place in most cases, for improved clarity and quality. The new thesis oral exam will take the form of a defence with different categories for the decision. The proposed format closely follows what is in place in MASc – Civil and Environmental Engine

SS/em

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 and Postdoctoral Affairs.

Faculty: Engineering
Program: Master of Engineering (MEng) in Electrical and Computer Engineering
Program contact name(s): Kankar Bhattacharya, Jessica Rossi
Form completed by: Jessica Rossi

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).

1. *Updating the MEng degree requirements to include one new Graduate Specialization in Business Leadership, which requires students to take 4 courses from a specified list as detailed below.*

2. *Increasing the number of required courses for the MEng degree from 8 to 9 or 10 (depending on the requirements associated with the ECE Graduate Specializations) for students completing the Business Leadership Graduate Specialization along with one other ECE Graduate Specialization.*

3. *Clarifying that students who receive a grade of less than 65% may be permitted to take a maximum of 2 additional courses to meet the minimum averages for the degree requirements.*

Is this a major modification to the program? Yes

Rationale for change(s):

1. *The Graduate Specialization has been designed to introduce students to the processes and best practices for leading technical teams, processes, and organizations in a North American business context. The key purpose of leadership is creating a framework for action. Doing this well requires an understanding of people, familiarity with the "language" of business which is finance, and disciplinary expertise. The Graduate Specialization supplements the expertise students develop in the ECE MEng program with the core skills needed to lead a business venture.*
   Note: Students are not expected to have a background in business to take any of the courses.

2. *Currently, MEng students must graduate if they have met their degree requirements after completing 8 courses, because the GSAC currently states that they must do so. If a student wants to complete the Business Leadership Graduate Specialization along with one other ECE Graduate Specialization, which may require 9 or 10 courses, they have to strategically plan their courses, so as not to meet the MEng degree requirements before completing the Graduate Specialization requirements. Increasing the number of courses will provide more flexibility and feasibility for students to pursue the Business Leadership Graduate Specialization and one other Graduate Specialization.*

3. *This rule is already implemented by the Department and is being added to the GSAC to provide transparency.*

Proposed effective date: Term: Fall Year: 2022

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/master-engineering-meng-electrical-and-computer-engineering

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:

Graduate specializations
 	
• Artificial Intelligence and Machine Learning
• Biomedical Engineering
• Computer Networking and Security
• Nanoelectronic Circuits and Systems
• Nanoelectronic Devices and Materials
• Software
• Sustainable Energy
 	
Degree requirements
 	
• **Graduate Academic Integrity Module (Graduate AIM)**
• **Courses**
  ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department.
  ○ Students may register for any ECE course at the 600 or 700 levels.
  ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science.
  ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative average of 70% are required to remain in the program.
  ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses.
  ○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations:
 	
1. Artificial Intelligence and Machine Learning
2. Biomedical Engineering
3. Computer Networking and Security
4. Nanoelectronic Circuits and Systems
5. Nanoelectronic Devices and Materials
	Graduate specializations
	
	• Artificial Intelligence and Machine Learning
	• Biomedical Engineering
	• Computer Networking and Security
	• Nanoelectronic Circuits and Systems
	• Nanoelectronic Devices and Materials
	• Software
	• Sustainable Energy
	• Business Leadership
	
	Degree requirements
	
	• **Graduate Academic Integrity Module (Graduate AIM)**
	• **Courses**
	  ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department.
	  ○ Students may register for any ECE course at the 600 or 700 levels.
	  ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science. Students opting for the Graduate Specialization in Business Leadership are allowed to take a maximum of 4 courses from outside ECE, but from the specified list of BE/BET courses, detailed below.
	  ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative average of 70% are required to remain in the program. Students who receive a grade of less than 65% may be permitted to take a maximum of 2 additional courses to meet the minimum averages for the degree requirements (outlined above).
	  ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses, as the number of minimum required courses may differ.

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
6. Software 7. Sustainable Energy ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering consist of a set of at least ~~5~~ graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. 1. Graduate Specialization in Artificial Intelligence and Machine Learning ○ To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 657A Data and Knowledge Modelling and Analysis ▪ Elective courses (choose 3 from the following list): ▪ ECE 602 Introduction to Optimization ▪ ECE 603 Statistical Signal Processing	○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations: 1. Artificial Intelligence and Machine Learning 2. Biomedical Engineering 3. Computer Networking and Security 4. Nanoelectronic Circuits and Systems 5. Nanoelectronic Devices and Materials 6. Software 7. Sustainable Energy 8. <u>Business Leadership</u> ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering consist of a set of at least <u>4</u> graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. ○ <u>Students will be able to complete the Business Leadership Graduate Specialization along with 1 other ECE Graduate Specialization, noting the following:</u> ▪ <u>Each course will only be counted towards one Graduate Specialization and the MEng degree.</u> ▪ <u>The number of required courses for the MEng degree will</u>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
▪ ECE 606 Algorithm Design and Analysis ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communication ▪ ECE 659 Intelligent Sensors and Sensor Networks ▪ ECE 700 Topic-7 Game Theory with Engineering Applications ▪ ECE 750 Topic-33 Artificial Life: Biology and Computation ▪ ECE 750 Topic-34 Artificial Life: Embodied Intelligence ▪ ECE 750 Topic-35 Applied Topics in Artificial Intelligence ▪ MSCI 718 Statistical Methods for Data Analytics 2. Graduate Specialization in Biomedical Engineering o To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 601 Foundations of Biology in Engineering ▪ ECE 608 Quantitative Methods in Biomedical Engineering ▪ ECE 609 Engineering Analysis of Living Cells ▪ Elective courses (choose 2 from the following list): ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communications ▪ ECE 675 Radiation and Propagation of Electromagnetic Fields ▪ ECE 750 Topic-33 Artificial Life: Biology and Computation	increase from 8 to 9 or 10 depending on the requirements associated with the Graduate Specializations. o Students must consult with the ECE Masters Coordinator to finalize their plan of study and to ensure that they are able to meet the degree and Graduate Specialization requirements within the program time limits. 1. Graduate Specialization in Artificial Intelligence and Machine Learning o To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 657A Data and Knowledge Modelling and Analysis ▪ Elective courses (choose 3 from the following list): ▪ ECE 602 Introduction to Optimization ▪ ECE 603 Statistical Signal Processing ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communication ▪ ECE 659 Intelligent Sensors and Sensor Networks ▪ ECE 700 Topic-7 Game Theory with Engineering Applications ▪ ECE 750 Topic-33 Artificial Life: Biology and Computation ▪ ECE 750 Topic-34 Artificial Life: Embodied Intelligence ▪ ECE 750 Topic-35 Applied Topics in Artificial Intelligence

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
▪ ECE 750 Topic-34 Artificial Life: Embodied Intelligence ▪ SYDE 677 Medical Imaging 3. Graduate Specialization in Computer Networking and Security o To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 610 Broadband Communication Networks ▪ ECE 628 Computer Network Security ▪ ECE 655 Protocols, Software, and Issues in Mobile Systems ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 611 Digital Communications ▪ ECE 612 Information Theory ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 659 Intelligent Sensors & Wireless Sensor Network ▪ ECE 715 Wireless Communication Networks ▪ ECE 716 Communication Security 4. Graduate Specialization in Nanoelectronic Circuits and Systems o To receive the Graduate Specialization in Nanoelectronic Circuits and Systems, students must successfully complete 1 compulsory project course (1.0 unit), and 5 elective courses: ▪ Compulsory course:	▪ MSCI 718 Statistical Methods for Data Analytics 2. Graduate Specialization in Biomedical Engineering o To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 601 Foundations of Biology in Engineering ▪ ECE 608 Quantitative Methods in Biomedical Engineering ▪ ECE 609 Engineering Analysis of Living Cells ▪ Elective courses (choose 2 from the following list): ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communications ▪ ECE 675 Radiation and Propagation of Electromagnetic Fields ▪ ECE 750 Topic-33 Artificial Life: Biology and Computation ▪ ECE 750 Topic-34 Artificial Life: Embodied Intelligence ▪ SYDE 677 Medical Imaging 3. Graduate Specialization in Computer Networking and Security o To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 610 Broadband Communication Networks ▪ ECE 628 Computer Network Security

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
▪ ECE 740 Topic-5 Nanoelectronic Circuits and Systems Project (1.0 unit) ▪ Elective courses Set-A (choose 2 from the following list): ▪ ECE 621 Computer Organization ▪ ECE 627 Register-transfer-level Digital Systems ▪ ECE 630 Physics & Models Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ ECE 636 Advanced Analog Integrated Circuits ▪ ECE 637 Digital Integrated Circuits ▪ ECE 642 Radio Frequency IC Design ▪ ECE 671 Microwave & RF Engineering ▪ Elective courses Set-B (choose 3 from the following list or from Set-A): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 638 CMOS Sensor Integrated Circuits ▪ ECE 730 Topic-9 VLSI Quality, Reliability and Yield Engineering ▪ ECE 730 Topic-16 Semiconductor Memories ▪ ECE 730 Topic-30 Advanced VLSI Devices ▪ ECE 738 VLSI Circuits for Wireless Communication ▪ ECE 740 Topic-3 CMOS Data Converters ▪ ECE 770 Topic-22 Wireless Radio Systems 5. Graduate Specialization in Nanoelectronic Devices and Materials o To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully	▪ ECE 655 Protocols, Software, and Issues in Mobile Systems ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 611 Digital Communications ▪ ECE 612 Information Theory ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 659 Intelligent Sensors & Wireless Sensor Network ▪ ECE 715 Wireless Communication Networks ▪ ECE 716 Communication Security 4. Graduate Specialization in Nanoelectronic Circuits and Systems o To receive the Graduate Specialization in Nanoelectronic Circuits and Systems, students must successfully complete 1 compulsory project course (1.0 unit), and 5 elective courses: ▪ Compulsory course: ▪ ECE 649 Nanoelectronic Circuits and Systems Project (1.0 unit) ▪ Elective courses Set-A (choose 2 from the following list): ▪ ECE 621 Computer Organization ▪ ECE 627 Register-transfer-level Digital Systems ▪ ECE 630 Physics & Models Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ ECE 636 Advanced Analog Integrated Circuits ▪ ECE 637 Digital Integrated Circuits

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 630 Physics and Models of Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE 633 Nanoelectronics ▪ ECE 634 Organic Electronics ▪ ECE 635 Fabrication in the Nanoscale: Technology and Applications ▪ ECE 672 Optoelectronic Devices ▪ NANO 600 Introduction to Nanotechnology 6. Graduate Specialization in Software o To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 650 Methods and Tools for Software Engineering ▪ ECE 651 Foundations of Software Engineering ▪ ECE 653 Software Testing, Quality Assurance and Maintenance ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 655 Protocols, Software, Issues in Mobile Systems ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design	▪ ECE 642 Radio Frequency IC Design ▪ ECE 671 Microwave & RF Engineering ▪ Elective courses Set-B (choose 3 from the following list or from Set-A): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 638 CMOS Sensor Integrated Circuits ▪ ECE 730 Topic-9 VLSI Quality, Reliability and Yield Engineering ▪ ECE 730 Topic-16 Semiconductor Memories ▪ ECE 730 Topic-30 Advanced VLSI Devices ▪ ECE 738 VLSI Circuits for Wireless Communication ▪ ECE 740 Topic-3 CMOS Data Converters ▪ ECE 770 Topic-22 Wireless Radio Systems 5. Graduate Specialization in Nanoelectronic Devices and Materials o To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 630 Physics and Models of Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE 633 Nanoelectronics ▪ ECE 634 Organic Electronics ▪ ECE 635 Fabrication in the Nanoscale: Technology and Applications ▪ ECE 672 Optoelectronic Devices

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
▪ ECE 658 Component Based Software 7. Graduate Specialization in Sustainable Energy ○ To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 663 Energy Processing ▪ ECE 760 Topic-10 Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): Note: not all elective courses may be offered each year. ▪ ECE 661 HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE 664 Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE 667 Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials ▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying	▪ NANO 600 Introduction to Nanotechnology 6. Graduate Specialization in Software ○ To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 650 Methods and Tools for Software Engineering ▪ ECE 651 Foundations of Software Engineering ▪ ECE 653 Software Testing, Quality Assurance and Maintenance ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 655 Protocols, Software, Issues in Mobile Systems ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 658 Component Based Software 7. Graduate Specialization in Sustainable Energy ○ To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 663 Energy Processing ▪ ECE 760 Topic-10 Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): Note: not all elective courses may be offered each year. ▪ ECE 632 Photovoltaic Energy Conversion

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
	▪ ECE 661 HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE 664 Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE 667 Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials ▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying 8. Business Leadership o To receive the Graduate Specialization in Business Leadership, students must successfully complete 2 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ BE 600 Management and Leadership ▪ BE 601 Introduction to Financial and Managerial Accounting ▪ Elective courses (choose 2 from the following list): Note: not all elective courses may be offered each year. ▪ BE 602 Data Analysis and Management ▪ BE 603 Operations and Supply Chain Management ▪ BE 604 Marketing Management ▪ BE 605 Project Management ▪ BE 606 Entrepreneurship and Innovation ▪ BE 610 Special Topics in Business and Entrepreneurship ▪ BE 680 Consulting

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
	▪ ECE 657A Data & Knowledge Modelling & Analysis ▪ ECE 699 Master of Engineering Project ○ Note: A maximum of 4 courses from outside the Department of ECE is permitted to satisfy both the MEng in ECE and Graduate Specialization in Business Leadership requirements.

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

1. *This Graduate Specialization will be available to students starting in Fall 2022. Current students will not be able to receive this Graduate Specialization.*
2. *Currently registered students will not be impacted by this change.*
3. *Currently registered students will not be impacted by this change since the rule is already implemented by the Department.*

Departmental approval date (mm/dd/yy): 11/20/20
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy):02/28/22
Faculty approval date (mm/dd/yy): 04/19/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Engineering (MEng) in Electrical and Computer Engineering

Program contact name(s): Kankar Bhattacharya, Jessica Rossi

Form completed by: Jessica Rossi

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Updating course numbers for some courses associated with the Graduate Specialization in Sustainable Energy.

Is this a major modification to the program? No

Rationale for change(s):

- *ECE 760 Topic 10 > ECE 660*
  - *This is a compulsory course for MEng in ECE Graduate Specialization in Sustainable Energy and offered on a regular basis; as such, a 600's series number is more appropriate.*
- *ECE 661 > ECE 761*
  - *Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.*
- *ECE 664 > ECE 762*
  - *Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.*
- *ECE 667 > ECE 763*
  - *Being an advanced course in power engineering, it is not offered on a regular basis; as such, a 700's series number is more appropriate. This is also an elective in the Sustainable Energy MEng Specialization.*

Proposed effective date: Term: Fall Year: 2022

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/master-engineering-meng-electrical-and-computer-engineering

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Degree requirements	**Degree requirements**

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
• **Courses** ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department. ○ Students may register for any ECE course at the 600 or 700 levels. ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science. ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative average of 70% are required to remain in the program. ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses. ○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations: 1. Artificial Intelligence and Machine Learning 2. Biomedical Engineering 3. Computer Networking and Security 4. Nanoelectronic Circuits and Systems 5. Nanoelectronic Devices and Materials 6. Software 7. Sustainable Energy ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering	• **Courses** ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department. ○ Students may register for any ECE course at the 600 or 700 levels. ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science. ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative average of 70% are required to remain in the program. ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses. ○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations: 1. Artificial Intelligence and Machine Learning 2. Biomedical Engineering 3. Computer Networking and Security 4. Nanoelectronic Circuits and Systems 5. Nanoelectronic Devices and Materials 6. Software 7. Sustainable Energy ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
consist of a set of at least 5 graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. ○ Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when they are offered and should plan accordingly. 7. Graduate Specialization in Sustainable Energy ○ To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 663 Energy Processing ▪ ECE ~~760 Topic-10~~ Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE ~~661~~ HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE ~~664~~ Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE ~~667~~ Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials	consist of a set of at least 5 graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. ○ Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when they are offered and should plan accordingly. 7. Graduate Specialization in Sustainable Energy ○ To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 663 Energy Processing ▪ ECE <u>660</u> Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE <u>761</u> HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE <u>762</u> Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE <u>763</u> Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying	▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying

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

Students currently registered in the program will not be negatively impacted, as they will still receive the Specialization, even if they took the courses numbered prior to the change.

Department/School approval date (mm/dd/yy): 10/21/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/07/22
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. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ECE

Course number: 660

Course ID: TBD

Course title (max. 100 characters including spaces): Operation and Control of Future Integrated Energy Systems

Course short title (max. 30 characters including spaces): Operation & Control Future IES

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: The course will provide a comprehensive overview of the operation and control of the integrated energy systems of the future. The course will be offered in modules, each module discussing one aspect of the subject, so as to provide a broad spectrum of coverage and understanding. Many emerging issues related to the paradigm of smart electricity grids, such as energy storage, demand response, microgrids, and others, will be discussed. The course will provide a multi-disciplinary perspective on the energy system of the

future, and will be open to graduate students from all engineering streams.

Meet type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Anti-Requisites: ECE 760 Topic 10

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This is a compulsory course for the MEng in ECE Graduate Specialization in Sustainable Energy and hence a 600's series number is more appropriate.

Note: please suppress Topic 10 from ECE 760 once ECE 660 goes into effect.

Form completed by: Jessica Rossi
Department/School approval date (mm/dd/yy): 10/21/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/07/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Revising the Course number and adding an Anti-requisite

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ECE

Course number:

Current Course number: 661
Revised Course number: 761

Course ID: 000797

Course title (max. 100 characters including spaces): HVDC and FACTS

Course short title (max. 30 characters including spaces): HVDC and FACTS

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: Application of state-of-the-art high power electronics to power transmission and distribution

systems. The emphasis will be on three important application areas - high voltage direct current (HVDC) transmission systems, flexible AC transmission Systems (FACTS) and Custom Power devices. The course addresses FACTS controllers including: static synchronous compensators (STATCOM), static synchronous series compensators (SSSC), interphase power flow controllers (IPFC) and unified power flow controllers (UPFC). Custom power devices such as shunt DSTATCOM, series compensating DVR and unified power quality conditioners (UPQC) are also discussed. This course will concentrate on the operating principles, models, and control and performance of power electronic systems used in these applications. Background required - ECE 463 or equivalent.

Meet type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Anti-Requisites: ECE 661

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Being an advanced course in power engineering, this course is not offered on a regular basis; hence, the 700 series number is requested.

Form completed by: Jessica Rossi
Department/School approval date (mm/dd/yy): 10/21/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/07/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Revising the Course number and adding an Anti-requisite

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ECE

Course number:

Current Course number: 664
Revised Course number: 762

Course ID: 000800

Course title (max. 100 characters including spaces): Power System Components and Modeling

Course short title (max. 30 characters including spaces): Power Syst Comp and Modeling

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: The basic structure, functional characteristics and protection schemes of the main

components that make up a power system are studied, in particular generators, transformers, transmission lines, cables, loads, HVDC and FACTS controllers. Models of these components for detailed electromagnetic transient analysis and phasor-based studies such as power flow and stability studies are discussed in detail, and various models are compared and validated through simulations performed with commercial software packages.

Meet type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Anti-Requisites: ECE 664

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Being an advanced course in power engineering, this course is not offered on a regular basis; hence, the 700 series number is requested.

Form completed by: Jessica Rossi
Department/School approval date (mm/dd/yy): 10/21/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/07/22
Faculty approval date (mm/dd/yy): 04/19/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Revising the Course number and adding an Anti-requisite

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ECE

Course number:

Current Course number: 667
Revised Course number: 763

Course ID: 000802

Course title (max. 100 characters including spaces): Sustainable Distributed Power Generation

Course short title (max. 30 characters including spaces): Sustainable Distributed Power

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: This course covers topics related to sustainable and clean energy resources; distributed

generation and utility interfacing. The following topics are covered: Wind power generators; construction; operation theory, modeling and analysis. Wind turbine interfacing techniques with the grid. Photovoltaic energy sources; construction, modeling, loading characteristics and interfacing requirements. Fuel cells; types, construction, modeling and characteristics, operation theory and interfacing requirement. Distributed generation concept; Barriers to DG interfacing; Reactive power control applications using the DG interfacing; Ancillary services supplied by DG. System protection requirements with DG.

Meet type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Anti-Requisites: ECE 667

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Being an advanced course in power engineering, this course is not offered on a regular basis; hence, the 700 series number is requested.

Form completed by: Jessica Rossi
Department/School approval date (mm/dd/yy): 10/21/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/07/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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 and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Engineering (MEng) in Electrical and Computer Engineering – Co-operative Program

Program contact name(s): Kankar Bhattacharya, Jessica Rossi

Form completed by: Jessica Rossi

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Adding a direct entry Co-operative program/option to the MEng in Electrical and Computer Engineering *program.*

Is this a major modification to the program? Yes

Rationale for change(s):

The rationale for the addition of the co-operative program/option are as follows:

- *To facilitate MEng students in applying the knowledge they gained in their coursework.*
- *Will help in professional development, networking and developing new collaborations.*
- *Aligns with the University's and Province's vision and policy on "Work Integrated Learning."*
- *Benefits in job search and placement of MEng students after completion of their programs.*
- *Will attract the best applicants to the MEng in ECE program, as well as to other graduate programs.*
- *Will allow international students to take up co-op jobs without impacting their Post Graduate Work Permit (PGWP).*

The co-operative program/option will be supported by Co-operative Education. Attached is the Feasibility Report that was completed by Co-operative Education.

Proposed effective date: Term: Fall Year: 2022

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

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
MASTER OF ENGINEERING (MENG) IN ELECTRICAL AND COMPUTER ENGINEERING	**MASTER OF ENGINEERING (MENG) IN ELECTRICAL AND COMPUTER**

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content:

Graduate specializations
 	
• Artificial Intelligence and Machine Learning
• Biomedical Engineering
• Computer Networking and Security
• Nanoelectronic Circuits and Systems
• Nanoelectronic Devices and Materials
• Software
• Sustainable Energy
 	
Program information
 	
• **Admit term(s)**
  ○ Fall
  ○ Winter
  ○ Spring
 	
• **Delivery mode**
  ○ On-campus
 	
• **Length of program**
  ○ Full-time: 4 terms (16 months)
  ○ Part-time: 8 terms (32 months)
 	
• **Program type**
  ○ Master's
  ○ Professional
 	
• **Registration option(s)**
  ○ Full-time
  ○ Part-time
 	
• **Study option(s)**
  ○ Coursework
 	
Admission requirements
 	
• **Minimum requirements**
  ○ The Department of Electrical and Computer Engineering requires either (i) a 75% overall standing in the last two years, or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent or (ii) a 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent, as the minimum requirement for admission to a Master's program for applicants educated at a Canadian institution. A 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or
	ENGINEERING - CO-OPERATIVE PROGRAM
	
	Graduate specializations
	
	• Artificial Intelligence and Machine Learning
	• Biomedical Engineering
	• Computer Networking and Security
	• Nanoelectronic Circuits and Systems
	• Nanoelectronic Devices and Materials
	• Software
	• Sustainable Energy
	
	Program information
	
	• **Admit term(s)**
	  ○ Fall
	  ○ Winter
	  ○ Spring
	
	• **Delivery mode**
	  ○ On-campus
	
	• **Length of program**
	  ○ Full-time: 5-6 terms (20-24 months)
	
	• **Program type**
	  ○ Co-operative
	  ○ Master's
	  ○ Professional
	
	• **Registration option(s)**
	  ○ Full-time
	
	• **Study option(s)**
	  ○ Coursework
	
	Admission requirements
	
	• **Minimum requirements**
	  ○ The Department of Electrical and Computer Engineering requires either (i) a 75% overall standing in the last two years, or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent or (ii) a 75% overall standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent, as the minimum requirement for admission to a Master's program for applicants educated at a Canadian institution. A 75% overall

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content:

equivalent is the minimum requirement for admission to a Master's program for applicants educated outside of Canada.
 	
• **Application materials**
  ○ Résumé
  ○ Supplementary information form
  ○ Transcript(s)
 	
• **References**
  ○ Number of references: 2
  ○ Type of references: at least 1 academic
 	
• **English language proficiency (ELP)** (if applicable)
 	
Degree requirements
 	
• **Graduate Academic Integrity Module (Graduate AIM)**
 	
• **Courses**
  ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department.
  ○ Students may register for any ECE course at the 600 or 700 levels.
  ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science.
  ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative average of 70% are required to remain in the program.
  ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses.
  ○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations:
 	
1. Artificial Intelligence and Machine Learning
2. Biomedical Engineering
3. Computer Networking and Security
	standing or equivalent, in a relevant four-year Honours Bachelor's degree or equivalent is the minimum requirement for admission to a Master's program for applicants educated outside of Canada.
	
	• **Application materials**
	  ○ Résumé
	  ○ Supplementary information form
	  ○ Transcript(s)
	
	• **References**
	  ○ Number of references: 2
	  ○ Type of references: at least 1 academic
	
	• **English language proficiency (ELP)** (if applicable)
	
	Degree requirements
	
	<u>The MEng in Electrical and Computer Engineering - Co-operative Program will enable students to combine graduate studies with work experience. The program will foster professional development, networking and new collaborations while enhancing employment opportunities after degree completion.</u>
	
	<u>The program will include 1 or 2 work terms. The timing of work and academic terms is fairly flexible, but the program must start and 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.</u>
	
	• **Graduate Academic Integrity Module (Graduate AIM)**
	
	• **Courses**
	  ○ Students must successfully complete 8 one-term courses (0.50 unit weight) acceptable for credit by the Department.
	  ○ Students may register for any ECE course at the 600 or 700 levels.
	  ○ A minimum of 5 courses must be taken from within the ECE Department. A maximum of 3 courses may be taken from outside the Department but must be from the faculties of Engineering, Math and Science.
	  ○ A minimum grade of 65% in each of the 8 courses and a minimum cumulative

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content:
4. Nanoelectronic Circuits and Systems 5. Nanoelectronic Devices and Materials 6. Software 7. Sustainable Energy ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering consist of a set of at least 5 graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. ○ Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take elective courses when they are offered and should plan accordingly. 1. Graduate Specialization in Artificial Intelligence and Machine Learning ○ To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 657 Tools of Intelligent Systems Design	average of 70% are required to remain in the program. ○ Students wishing to complete a Graduate Specialization as part of their MEng program should consult the list of required courses for each Graduate Specialization before selecting courses. ○ Students in the MEng in Electrical and Computer Engineering program may choose to pursue one of the following Graduate Specializations: 1. Artificial Intelligence and Machine Learning 2. Biomedical Engineering 3. Computer Networking and Security 4. Nanoelectronic Circuits and Systems 5. Nanoelectronic Devices and Materials 6. Software 7. Sustainable Energy ○ A Graduate Specialization is a University credential that is recognized on the student's transcript but not on the diploma and is intended to reflect that a student has successfully completed a set of courses that together provide an in-depth study in the area of the Graduate Specialization. A student will only obtain the Graduate Specialization on their transcript if they have completed the requirements associated with the MEng degree and the requirements associated with the Graduate Specialization. ○ All MEng Graduate Specializations in Electrical and Computer Engineering consist of a set of at least 5 graduate (0.50 weight) level courses and this set is comprised of a mix of compulsory and elective courses. Compulsory courses are those that are prescribed as part of the Graduate Specialization. Elective courses are those that are on a list of courses designated as electives for a given Graduate Specialization. The requirements for each of the Graduate Specializations are described below. ○ Note: Not all elective courses for any given Graduate Specialization are guaranteed to be offered each year. Students are encouraged to take

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content:
▪ ECE 657A Data and Knowledge Modelling and Analysis ▪ Elective courses (choose 3 from the following list): ▪ ECE 602 Introduction to Optimization ▪ ECE 603 Statistical Signal Processing ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communication ▪ ECE 659 Intelligent Sensors and Sensor Networks ▪ ECE 700 Topic-7 Game Theory with Engineering Applications ▪ ECE 750 Topic-32 Biology and Computation ▪ ECE 750 Topic-33 Embodied Intelligence ▪ ECE 750 Topic-35 Social Robotics ▪ MSCI 718 Statistical Methods for Data Analytics 2. Graduate Specialization in Biomedical Engineering o To receive the Graduate Specialization in Biomedical Engineering, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 601 Foundations of Biology in Engineering ▪ ECE 608 Quantitative Methods in Biomedical Engineering ▪ ECE 609 Engineering Analysis of Living Cells ▪ Elective courses (choose 2 from the following list): ▪ ECE 607 Fundamentals of Ultrasonics	elective courses when they are offered and should plan accordingly. 1. Graduate Specialization in Artificial Intelligence and Machine Learning o To receive the Graduate Specialization in Artificial Intelligence and Machine Learning, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 657A Data and Knowledge Modelling and Analysis ▪ Elective courses (choose 3 from the following list): ▪ ECE 602 Introduction to Optimization ▪ ECE 603 Statistical Signal Processing ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communication ▪ ECE 659 Intelligent Sensors and Sensor Networks ▪ ECE 700 Topic-7 Game Theory with Engineering Applications ▪ ECE 750 Topic-32 Biology and Computation ▪ ECE 750 Topic-33 Embodied Intelligence ▪ ECE 750 Topic-35 Social Robotics ▪ MSCI 718 Statistical Methods for Data Analytics 2. Graduate Specialization in Biomedical Engineering o To receive the Graduate Specialization in Biomedical Engineering, students

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
▪ ECE 613 Image Processing and Visual Communications ▪ ECE 675 Radiation and Propagation of Electromagnetic Fields ▪ ECE 750 Topic-32 Biology and Computation ▪ ECE 750 Topic-33 Embodied Intelligence ▪ SYDE 677 Medical Imaging 3. Graduate Specialization in Computer Networking and Security o To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 610 Broadband Communication Networks ▪ ECE 628 Computer Network Security ▪ ECE 655 Protocols, Software, and Issues in Mobile Systems ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 611 Digital Communications ▪ ECE 612 Information Theory ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 659 Intelligent Sensors & Wireless Sensor Network ▪ ECE 715 Wireless Communication Networks ▪ ECE 716 Communication Security	must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 601 Foundations of Biology in Engineering ▪ ECE 608 Quantitative Methods in Biomedical Engineering ▪ ECE 609 Engineering Analysis of Living Cells ▪ Elective courses (choose 2 from the following list): ▪ ECE 607 Fundamentals of Ultrasonics ▪ ECE 613 Image Processing and Visual Communications ▪ ECE 675 Radiation and Propagation of Electromagnetic Fields ▪ ECE 750 Topic-32 Biology and Computation ▪ ECE 750 Topic-33 Embodied Intelligence ▪ SYDE 677 Medical Imaging 3. Graduate Specialization in Computer Networking and Security o To receive the Graduate Specialization in Computer Networking and Security, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 610 Broadband Communication Networks ▪ ECE 628 Computer Network Security ▪ ECE 655 Protocols, Software, and Issues in Mobile Systems ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 611 Digital Communications ▪ ECE 612 Information Theory

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
4. Graduate Specialization in Nanoelectronic Circuits and Systems ○ To receive the Graduate Specialization in Nanoelectronic Circuits and Systems, students must successfully complete 1 compulsory project course (1.0 unit), and 5 elective courses: ○ Note: Students are required to complete the 5 elective courses prior to enrolling in the ECE 649 project course. ○ The Graduate Specialization in Nanoelectronic Circuits and Systems is primarily designed for students starting in the Fall term. Therefore, if a student starts in the Spring or Winter term the Graduate Specialization may not be guaranteed, due to the sequencing of elective courses. ▪ Compulsory course: ▪ ECE 649 Nanoelectronic Circuits and Systems Project (1.0 unit) ▪ Elective courses: Choose 5 total between Set-A and Set-B. A minimum of 2 of the 5 electives must be taken from Set-A. ▪ Set-A: ▪ ECE 621 Computer Organization ▪ ECE 627 Register-transfer-level Digital Systems ▪ ECE 630 Physics & Models Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ ECE 636 Advanced Analog Integrated Circuits ▪ ECE 637 Digital Integrated Circuits ▪ ECE 642 Radio Frequency IC Design	▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 659 Intelligent Sensors & Wireless Sensor Network ▪ ECE 715 Wireless Communication Networks ▪ ECE 716 Communication Security 4. Graduate Specialization in Nanoelectronic Circuits and Systems ○ To receive the Graduate Specialization in Nanoelectronic Circuits and Systems, students must successfully complete 1 compulsory project course (1.0 unit), and 5 elective courses: ○ Note: Students are required to complete the 5 elective courses prior to enrolling in the ECE 649 project course. ○ The Graduate Specialization in Nanoelectronic Circuits and Systems is primarily designed for students starting in the Fall term. Therefore, if a student starts in the Spring or Winter term the Graduate Specialization may not be guaranteed, due to the sequencing of elective courses. ▪ Compulsory course: ▪ ECE 649 Nanoelectronic Circuits and Systems Project (1.0 unit) ▪ Elective courses: Choose 5 total between Set-A and Set-B. A minimum of 2 of the 5 electives must be taken from Set-A. ▪ Set-A: ▪ ECE 621 Computer Organization ▪ ECE 627 Register-transfer-level Digital Systems ▪ ECE 630 Physics & Models Semiconductor Devices

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
▪ ECE 671 Microwave & RF Engineering ▪ Set-B: ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 638 CMOS Sensor Integrated Circuits ▪ ECE 730 Topic-9 VLSI Quality, Reliability and Yield Engineering ▪ ECE 730 Topic-16 Embedded Semiconductor RAM ▪ ECE 730 Topic-30 Advanced VLSI Devices ▪ ECE 738 VLSI Circuits for Wireless Communication ▪ ECE 740 Topic-3 CMOS Data Converters ▪ ECE 770 Topic-22 Radio and Wireless Systems 5. Graduate Specialization in Nanoelectronic Devices and Materials o To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 630 Physics and Models of Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion	▪ ECE 631 Microelectronic Processing Technology ▪ ECE 636 Advanced Analog Integrated Circuits ▪ ECE 637 Digital Integrated Circuits ▪ ECE 642 Radio Frequency IC Design ▪ ECE 671 Microwave & RF Engineering ▪ Set-B: ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 638 CMOS Sensor Integrated Circuits ▪ ECE 730 Topic-9 VLSI Quality, Reliability and Yield Engineering ▪ ECE 730 Topic-16 Embedded Semiconductor RAM ▪ ECE 730 Topic-30 Advanced VLSI Devices ▪ ECE 738 VLSI Circuits for Wireless Communication ▪ ECE 740 Topic-3 CMOS Data Converters ▪ ECE 770 Topic-22 Radio and Wireless Systems 5. Graduate Specialization in Nanoelectronic Devices and Materials

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
▪ ECE 633 Nanoelectronics ▪ ECE 634 Organic Electronics ▪ ECE 635 Fabrication in the Nanoscale: Technology and Applications ▪ ECE 672 Optoelectronic Devices ▪ NANO 600 Introduction to Nanotechnology 6. Graduate Specialization in Software o To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 650 Methods and Tools for Software Engineering ▪ ECE 651 Foundations of Software Engineering ▪ ECE 653 Software Testing, Quality Assurance and Maintenance ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 655 Protocols, Software, Issues in Mobile Systems ▪ ECE 656 Database Systems ▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 658 Component Based Software 7. Graduate Specialization in Sustainable Energy o To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses:	o To receive the Graduate Specialization in Nanoelectronic Devices and Materials, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 630 Physics and Models of Semiconductor Devices ▪ ECE 631 Microelectronic Processing Technology ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE 633 Nanoelectronics ▪ ECE 634 Organic Electronics ▪ ECE 635 Fabrication in the Nanoscale: Technology and Applications ▪ ECE 672 Optoelectronic Devices ▪ NANO 600 Introduction to Nanotechnology 6. Graduate Specialization in Software o To receive the Graduate Specialization in Software, students must successfully complete 3 compulsory courses and 2 elective courses: ▪ Compulsory courses: ▪ ECE 650 Methods and Tools for Software Engineering ▪ ECE 651 Foundations of Software Engineering ▪ ECE 653 Software Testing, Quality Assurance and Maintenance ▪ Elective courses (choose 2 from the following list): ▪ ECE 606 Algorithm Design and Analysis ▪ ECE 655 Protocols, Software, Issues in Mobile Systems ▪ ECE 656 Database Systems

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
▪ ECE 663 Energy Processing ▪ ECE 760 Topic-10 Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE 661 HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE 664 Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE 667 Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials ▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying	▪ ECE 657 Tools of Intelligent Systems Design ▪ ECE 658 Component Based Software 7. Graduate Specialization in Sustainable Energy o To receive the Graduate Specialization in Sustainable Energy, students must successfully complete 2 compulsory courses and 3 elective courses: ▪ Compulsory courses: ▪ ECE 663 Energy Processing ▪ ECE 760 Topic-10 Operation and Control of Future Integrated Energy Systems ▪ Elective courses (choose 3 from the following list): ▪ ECE 632 Photovoltaic Energy Conversion ▪ ECE 661 HVDC and FACTS ▪ ECE 662 Power System Analysis and Control ▪ ECE 664 Power System Components and Modelling ▪ ECE 665 High Voltage Engineering Applications ▪ ECE 666 Power Systems Operation ▪ ECE 667 Sustainable Distributed Power Generation ▪ ECE 668 Distribution System Engineering ▪ ECE 669 Dielectric Materials ▪ ECE 768 Power System Quality ▪ ECE 765 Power System Protection and Relaying • **<u>Graduate Studies Work Report</u>** o <u>Students must complete one or two work-term placements. A work report must be submitted to the Department for review and credit by the end of each work term.</u>

Current MEng in Electrical and Computer Engineering Graduate Studies Academic Calendar content:	**Proposed MEng in Electrical and Computer Engineering - Co-operative Program Graduate Studies Academic Calendar content**:
	○ Students are responsible for following the regulations and procedures of Co-operative and Experiential Education (CEE).

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

Students currently enrolled in the MEng in ECE program will not be impacted, as this will only be offered to students starting in Fall 2022.

Department/School approval date (mm/dd/yy): 01/21/2022
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/01/22
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. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Graduate Studies Work Report

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: Choose an item.

Course number:

Course ID:

Course title (max. 100 characters including spaces):

Course short title (max. 30 characters including spaces):

Grading basis: Choose an item.

Course credit weight: Choose an item.

Course consent required: Choose an item.

Course description:

Meet type(s): Choose an item. Choose an item. Choose an item. Choose an item.

Primary meet type: Choose an item.

Delivery mode: Choose an item.

Requisites:

Special topics course: Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Please see attached program revision template for the rationale.

Please add the following milestone to the program listed below:

MEng in Electrical and Computer Engineering – Co-operative Program:

1) Graduate Studies Work Report

Form completed by: Jessica Rossi
Department/School approval date (mm/dd/yy): 01/21/2022
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/01/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Co-operative & Experiential Education (CEE) Response to Program Proposal Based on Existing Resources

Master of Electrical and Computer Engineering (MEng ECE)

Prepared by: Eva Skuza, Faculty Relations Manager, Engineering, Student and Faculty Relations, CEE & Rachel Jenson, Faculty Relations Manager, Arts, Student and Faculty Relations, CEE

Executive Summary

The Department of Electrical and Computer Engineering (ECE) has expressed intent to add a co-op program option to their master's program. Co-operative & Experiential Education (CEE) will utilize existing staff, resources, and co-op processes to support this new program, as it does for other graduate co-op programs in Engineering. CEE will require sufficient time to complete a feasibility report and to work with the program in the coming months to address structure, logistics, pre-experience programming and job development opportunities.

CEE supports in principle the proposed new MEng ECE Co-op program and will collaborate with the program on:

- Finalizing program sequence structure
- Work with the CEE International Team to understand work permit needs and timelines due to student demographics

CEE recommends that the Department of ECE:

- Establish admission requirements for Fall 2022 and examine adding direct admission to a co-op program for Fall 2023 in consideration of work permit timelines
- Investigate co-op fees and possible funding implications
- Include co-op degree requirements in graduate calendar
- Meet with Faculty Relations Manager for full feasibility study

CEE, with leadership from the Faculty Relations Manager (FRM) Engineering will:

- Coordinate a co-op support model with the Centre for Career Action (CCA)
- Complete feasibility study in partnership with CEE units including Co-operative Education (CE), Data Analysis and Reporting Team (DART), Work-Integrated Learning Programs (WIL-P) and Centre for Career Action (CCA)

- Facilitate the creation of a job development plan in partnership with Co-operative Education's Employment Relations department (ER)

Program Overview

Co-operative Education as a form of Work-Integrated Learning (WIL), allows students to apply classroom learning to the workplace and, likewise, connect workplace learning to their degree and areas of specialization. For those students who are seeking a stronger connection between their studies and industry, the University of Waterloo's co-op programs distinguish it in Canadian institutions. Furthermore, it provides a robust system of support for students (domestic and international visa) seeking work experiences in Canada or internationally.

Benefits go beyond the students. Industry partners will benefit by gaining access to a wider range of grad students who bring varied experience personally, professionally, and academically. All stakeholders will benefit from opportunities for idea exchange and strengthened connection between academic research and innovations in industry.

Introducing a new co-op plan aligns with the focus on Graduate Co-op and WIL at an institutional level, and will continue to reinforce University of Waterloo (UW) as a WIL leader for both undergraduate and graduate co-op.

Program Structure

A quality WIL experience aligns pedagogically with the academic program, incorporates pre-experience preparation, supports during the experience, as well as learning and/or reflection post-experience. The MEng ECE Co-op program, as with other graduate co-op programs, will follow the existing co-op model. All co-op students, graduate and undergraduate, are responsible for following the regulations and procedures of CEE.

CEE recommends that students complete PD601 prior to the co-op experience, ideally in the Spring term while they apply to jobs concurrently. PD601 is a professional development course for graduate co-op students. It provides information on navigating the co-op employment process, foundational career preparation as well as reflection and teaches students how to prepare professional job search documents. Other Engineering graduate programs (Management Sciences) have positioned PD601 as a foundational requirement for co-op participation. Students who have already completed similar UW co-op preparation modules, such as PD1, may be granted a waiver.

The Centre for Career Action (CCA) provides career and co-op preparation resources and services (resume, cover letter, interview preparation, job search, etc.) for all graduate students. The CCA also offers workshops focused on preparing students to think about their skills, the labour market and possible career paths. These services are accessed more readily when promoted by the academic program or incorporated into existing courses. Additional collaboration between ECE and CCA will be required prior to Fall 2022 to establish how existing services and staff will be utilized.

Co-op work terms must meet **work term requirements** and students can access co-op job boards through WaterlooWorks or arrange their own employment, externally, which must be approved by CEE. During the experience, graduate students will be supported by Co-op Advisors through site visits, e-check-ins, work term ratings and employer performance evaluations.

As a best practice, it is recommended students in MEng ECE Co-op return for a final study term following the co-op work experience. MEng ECE will facilitate a work report and/or reflection assignment post-experience which will act as a degree milestone. Co-op is willing to provide advice as required.

To evaluate program effectiveness and WIL outcomes, the FRM Engineering will monitor key metrics to ensure program quality.

Co-op Sequence

Students in MEng ECE will be required to complete one standard co-op work term; however, CEE strongly recommends that the program allow for two consecutive co-op work terms (one standard and one flex or standard) in their program structure. Strategically, this proposed sequence would provide a longer immersive work experience for students, which is particularly appealing to industry employer partners, and would be consistent with other UW graduate co-op plans. Additionally, current sequences have few, if any, graduate students available for winter co-op employment, so ECE students may be at an advantage by being available for work during this time.

Fall	Winter	Spring	Fall	Winter	Spring
Study Students admitted into co-op	Study	Study Completion of PD:601	**Work Term**	**Work Term**	Study Completion of Work Report

Co-op Degree Requirements

Graduate students completing the co-operative education degree requirements will receive a "Co-operative Education" degree designation. To summarize, we propose the following:

- Complete PD601: Career Success Strategies
- Complete a minimum of 1 standard co-op work term and receive an employer evaluation of "Marginal" or better
- Complete the ECE work report requirement

Job Development

With all new programs, the feasibility study will review the labour market, job demands, and areas for business development. With the strategic goal of expanding WIL in graduate programs there will be additional focus on strategies to develop jobs that are meaningful for the learning of graduate students.

Generally, there are two years of lead time to develop jobs ahead of the first work term, which is not available with this proposal. However, with strong connections into associated industries, CEE can provide a range of suitable opportunities for students. As a course-based program with many course options, marketing these students to employers may be challenging given the more specialized and focused areas of expertise and knowledge graduate students bring. Best efforts will be made to support graduate students in their job search – for example, CEE has proactively been engaged with Mitacs and the funding they have access to for WIL at the graduate level. Existing services and expertise in CCA will be leveraged to support students in their job search, noting that the feasibility study process will examine the resourcing required to provide these supports.

Additional Considerations

Graduate WIL

CEE and the GSPA, along with the faculties are undergoing a multi-unit, multi-year project to expand WIL offerings at the graduate level and enhance CEE co-op programming, support, and processes for graduate students. There is reason to expect that graduate co-op will undergo several changes over the coming year(s) which will impact existing programming, support, and job development efforts for graduate students.

Co-op Admissions

For Fall 2022, students will be admitted to co-op upon completion of the first academic term. As discussed, the program plans to utilize direct entry into co-op using a specific process and criteria for future admissions beginning Fall 2023.

Where there is demand for co-op, consideration should be given to the value and intention of a WIL experience, as academic standing is not always an indicator of workplace success. Additionally, graduate students bring a range of personal, professional, and academic experiences and so while the more experienced students may ultimately be successful in finding co-op employment, they arguably may not be the students to benefit most from the WIL experience.

Student Status and Fees

Graduate co-op students pay a co-op fee during employed co-op work terms. Participation in graduate co-op may also have implications for student statuses, funding packages and scholarships. The program will need to investigate further and make students aware of this.

International Students and Work Experiences

Program demographics indicate that approximately 89% of students are international visa students. Based on our understanding, direct admissions to the co-op program allows students to concurrently obtain their co-op work permit and study permit. Applying for a co-op permit in Canada can take 6-8 months.

The CEE international team will support work terms held outside of Canada, adhering to UW and Global Affairs Canada (GAC) travel polices and advisories.

Equity

Equity is an important component to consider within a competitive admissions and co-op process. For example, international students may encounter additional barriers such as: varying levels and types of work experience of incoming students, potential for travel restrictions implemented by the Government of Canada, as well as the complexities of obtaining funding and/or security clearance that may be required for some roles can often be a disadvantage to international students and can delay or impact work term opportunities.

Centre for Career Action (CCA)

The Centre for Career Action (CCA) is located in the Tatham Centre at the Waterloo campus and provides support to undergrad and grad students (whether in co-op or not), alumni and staff with co-op and career planning and preparation. Existing services include 1:1 appointments for resumes, cover letters, interview skills, work search, career planning and others, 1:1 drop-ins, workshops, both on and offline resources and supports all offered through a dedicated team of existing co-op and career staff.

Grad co-op students are assigned a team of Career Advisors who provide answers to co-op related questions and concerns as well as support throughout the co-op recruitment process. Once students secure a work term, they are offered additional support via a dedicated co-op Student Advisor who provides site visits, e-check-ins, work term ratings and evaluations.

Feasibility Study

Given that this program is considered as a pilot for Fall 2022, a complete feasibility report is recommended. CEE will require sufficient time (3-4 months minimum) to complete a feasibility report and to work with the program in the coming months to address structure, logistics, pre-experience programming and job development opportunities.

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*): Course description, Course title

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: SYDE

Course number: 655

Course ID: 014498

Course title (max. 100 characters including spaces): **NEW:** Optimal and Learning-Based Control (*current: Optimal Control*)

Course short title (max. 30 characters including spaces): **NEW:** Optimal and Learning-Based Control (*current: Optimal Control*)

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description:
NEW: This course provides an understanding of the principles of optimal control while introducing the key ideas of learning-based control and discussing intersections between these two broad areas. Variational approach,

Pontryagin's Minimum Principle, linear quadratic optimal control, the principle of optimality, dynamic programming, and the Hamilton-Jacobi-Bellman equation are covered. Model predictive control is presented. A brief introduction to learning for control applications is provided, along with introducing iterative learning control. Model-based and model-free reinforcement learning (RL) techniques, connections between RL and optimal control ideas, and approximate RL solution methods for complex problems are discussed.

Current: *This course is intended to provide an understanding of the principles of optimal control and how they are used in various engineering applications. Dynamic programming, variational approach and Pontryagin's Minimum Principle, linear quadratic optimal control, discrete-time optimal control, constrained optimal control systems and model predictive control are introduced. Numerical methods for optimal control problems are also discussed briefly*.

Meet type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: Antireq: SYDE 750 Topic 22 - Optimal Control

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status: N/A

Sections combined/held with: N/A

Rationale for request: To upgrade the course contents and make it more relevant to recent advanced engineering applications, particularly in the fields of intelligent and autonomous systems, by covering elegant optimal control solution techniques for complex, large-scale, or challenging control problems including systems with unknown and changing dynamics. The course title and description have been revised to reflect major updates to the contents.

The course is also listed on the MEng program page as one of the potential courses tied to the Specialization in Mechatronic and Physical Systems. Since the change to the title is minor we hope to be able to make this an editorial change.

Form completed by: J. Sparry
Department/School approval date (mm/dd/yy): 02/15/2022
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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 and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Applied Science (MASc) in Mechanical and Mechatronics Engineering

Program contact name(s): Cecile Devaud

Form completed by: Cecile Devaud

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Mechanical and Mechatronics Engineering wants to modify the degree requirements for the MASc by adding attendance of at least 8 research seminars and formalizing the current Master's seminar into a thesis oral defence.

Is this a major modification to the program? No

Rationale for change(s):

Currently, research seminar attendance is a degree requirement for the MASc in MME - Nanotechnology (at least 8) and MEng in Mechanical and Mechatronics Engineering (at least 4) programs, however nothing is currently specified for the regular MASc in Mechanical and Mechatronics Engineering program. For consistency with existing Master's degrees, the Department of Mechanical and Mechatronics Engineering would like to add the attendance of at least 8 research seminars to the degree requirements. This will strengthen the research exposure of MASc students and build a stronger graduate community in the Department of Mechanical and Mechatronics Engineering.
Currently, there is no specified format of the research seminar that must be given by MASc students. In practice, the research seminar is given in front of the two thesis readers and supervisor (s) after they received and reviewed the thesis who ask questions about the thesis work. The Department of Mechanical and Mechatronics Engineering wants to formalize the format of the thesis examination that is already taken place in most cases, for improved clarity and quality. The new thesis oral exam will take the form of a defence with different categories for the decision. The proposed format closely follows what is in place in the MASc in Civil Engineering program.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Degree requirements **Thesis option:** The MASc program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both. • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit). A maximum of 1 500-level course may be counted for credit. o Additional Faculty regulations concerning Master's degree requirements are: ▪ At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series. ▪ No more than half of the courses used for credit may be taught by the candidate's supervisor. ▪ The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure). ▪ At least half of the courses used for credit must normally be Faculty of Engineering courses. • **Graduate Safety Milestone** o The Graduate Safety Milestone must be completed by the end of the student's second registered term. • ~~**Master's Seminar**~~ • **Master's Thesis**	**Degree requirements** **Thesis option:** The MASc program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both. • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit). A maximum of 1 500-level course may be counted for credit. o Additional Faculty regulations concerning Master's degree requirements are: ▪ At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series. ▪ No more than half of the courses used for credit may be taught by the candidate's supervisor. ▪ The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure). ▪ At least half of the courses used for credit must normally be Faculty of Engineering courses**.** • **Graduate Safety Milestone** o The Graduate Safety Milestone must be completed by the end of the student's second registered term. • **<u>Seminar Attendance:</u>** o <u>Students must attend at least 8 MME research seminars.</u>

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
○ Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. ~~Two assessors will then be appointed to aid each candidate's supervisor(s) in evaluating the thesis~~. ~~Normally, the assessors will be members of the Mechanical and Mechatronics Engineering Department, one being external to the supervisor's research group~~. .	• **Master's Thesis** ○ Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. ○ Students must orally defend a thesis a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The composition of the Examining Committee must be consistent with the committee composition outlined in the Faculty of Engineering minimum requirements section of the Graduate Studies Academic Calendar. The topic of the thesis is arranged by the supervisor(s) and the student.

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

No change for MASc students currently registered and prior to Fall 2022.

Department/School approval date (23/02/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/07/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Program: Master of Applied Science (MASc) in Mechanical and Mechatronics Engineering - Nanotechnology

Program contact name(s): Cecile Devaud

Form completed by: Cecile Devaud

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Mechanical and Mechatronics Engineering wants to modify the degree requirements for the MASc by adding attendance of at least 8 research seminars and formalizing the current Master's seminar into a thesis oral defence.

Is this a major modification to the program? No

Rationale for change(s):

Currently, research seminar attendance is a degree requirement for the MASc in MME - Nanotechnology (at least 8) and MEng in Mechanical and Mechatronics Engineering (at least 4) programs, however nothing is currently specified for the regular MASc in Mechanical and Mechatronics Engineering program. For consistency with existing Master's degrees, the Department of Mechanical and Mechatronics Engineering would like to add the attendance of at least 8 research seminars to the degree requirements. This will strengthen the research exposure of MASc students and build a stronger graduate community in the Department of Mechanical and Mechatronics Engineering.

Currently, there is no specified format of the research seminar that must be given by MASc students. In practice, the research seminar is given in front of the two thesis readers and supervisor (s) after they received and reviewed the thesis who ask questions about the thesis work. The Department of Mechanical and Mechatronics Engineering wants to formalize the format of the thesis examination that is already taken place in most cases, for improved clarity and quality. The new thesis oral exam will take the form of a defence with different categories for the decision. The proposed format closely follows what is in place in the MASc in Civil Engineering program.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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-mechanical-and-mechatronics-engineering/master-applied-science-masc-mechanical-and-mechatronics-engineering-nanotechnology

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
Degree requirements **Thesis option:** The MASc program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both. • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit), including NANO 600 Introduction to Nanotechnology and 1 nanotechnology core course. A maximum of 1 500-level course may be counted for credit. o Nanotechnology core courses: ▪ NANO 601 Characterization of Nanomaterials ▪ NANO 602 Structure and Spectroscopy of Nanoscale Materials ▪ NANO 603 Nanocomposites ▪ NANO 604 Nanomechanics and Molecular Dynamics Simulations ▪ NANO 605/SYDE 683 Design of MEMS & NEMS ▪ NANO 606/SYDE 682 Advanced MicroElectroMechanical Systems: Physics, Design & Fabrication o Core courses are designed to provide the base knowledge and skill set required to prepare students for more specialized courses and to conduct interdisciplinary nanoscale research. o Students who have completed their Bachelor of Applied Science (BASc) degree in Nanotechnology Engineering at the University of Waterloo can not take NANO 600. Instead, they can	**Degree requirements** **Thesis option:** The MASc program emphasizes high level independent research by candidates. The topic of the thesis and the choice of courses are decided by the student and their supervisor(s). Each student's program is subject to the approval of the Associate Chair for Graduate Studies. Candidates will participate in a research program generally involving either theory or experimentation, or both. • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must complete 4 one-term (0.50 unit weight) graduate level courses (or courses acceptable for graduate credit), including NANO 600 Introduction to Nanotechnology and 1 nanotechnology core course. A maximum of 1 500-level course may be counted for credit. o Nanotechnology core courses: ▪ NANO 601 Characterization of Nanomaterials ▪ NANO 602 Structure and Spectroscopy of Nanoscale Materials ▪ NANO 603 Nanocomposites ▪ NANO 604 Nanomechanics and Molecular Dynamics Simulations ▪ NANO 605/SYDE 683 Design of MEMS & NEMS ▪ NANO 606/SYDE 682 Advanced MicroElectroMechanical Systems: Physics, Design & Fabrication o Core courses are designed to provide the base knowledge and skill set required to prepare students for more specialized courses and to conduct interdisciplinary nanoscale research. o Students who have completed their Bachelor of Applied Science (BASc) degree in Nanotechnology Engineering at the University of Waterloo can not take NANO 600. Instead, they can

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
choose 1 course from the list of nanotechnology core courses. ○ Additional Faculty regulations concerning Master's degree requirements are: ▪ At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series. ▪ No more than half of the courses used for credit may be taught by the candidate's supervisor. ▪ The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure). ▪ At least half of the courses used for credit must normally be Faculty of Engineering courses. • **Graduate Safety Milestone** ○ The Graduate Safety Milestone must be completed by the end of the student's second registered term. • **Nanotechnology Seminar** ○ This seminar is a forum for student presentation of research results or proposals. Invited speakers from academia and industry will also present results of research from time to time. The range of topics that will be addressed in the seminar crosses all areas of research in the collaborative program. Each student is required to present at least 1 research seminar. To receive credit, students are expected to attend at least 8 seminars other than their own before completing their program. • **Master's Thesis** ○ Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. ~~Two assessors will then be appointed to aid each candidate's supervisor(s) in evaluating the thesis. Normally, the assessors will be members of the Mechanical and Mechatronics~~	choose 1 course from the list of nanotechnology core courses. ○ Additional Faculty regulations concerning Master's degree requirements are: ▪ At least two-thirds of the courses used for credit in a candidate's program must be taken from the 600 and 700 series. ▪ No more than half of the courses used for credit may be taught by the candidate's supervisor. ▪ The candidate must obtain a pass in all courses credited to their program, with a minimum overall average of 70% (a grade of less than 65% in any course counts as a failure). ▪ At least half of the courses used for credit must normally be Faculty of Engineering courses. • **Graduate Safety Milestone** ○ The Graduate Safety Milestone must be completed by the end of the student's second registered term. • **<u>Seminar Attendance:</u>** ○ <u>Students must attend at least 8 MME research seminars.</u> • **Nanotechnology Seminar** ○ This seminar is a forum for student presentation of research results or proposals. Invited speakers from academia and industry will also present results of research from time to time. The range of topics that will be addressed in the seminar crosses all areas of research in the collaborative program. Each student is required to present at least 1 research seminar. To receive credit, students are expected to attend at least 8 seminars other than their own before completing their program. ○ <u>The Nanotechnology Seminar may simultaneously count towards the Seminar Attendance requirement of the MME Department</u>. • **Master's Thesis**

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
~~Engineering Department, one being external to the supervisor's research group.~~	○ Candidates are requested to give advance notice of their intention to submit a thesis approximately three months prior to submission. ○ Students must orally defend a thesis a thesis embodying the results of independent research work to the satisfaction of an Examining Committee. The composition of the Examining Committee must be consistent with the committee composition outlined in the Faculty of Engineering minimum requirements section of the Graduate Studies Academic Calendar. The topic of the thesis is arranged by the supervisor(s) and the student.

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

No change for MASc students currently registered and prior to Fall 2022.

Department/School approval date (23/02/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/07/22
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. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Seminar Attendance

Please add the "Seminar Attendance" milestone to the programs listed below:
Master of Applied Science (MASc) in Mechanical and Mechatronics Engineering
Master of Applied Science (MASc) in Mechanical and Mechatronics Engineering – Nanotechnology

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: Choose an item.

Course number:

Course ID:

Course title (max. 100 characters including spaces):

Course short title (max. 30 characters including spaces):

Grading basis: Choose an item.

Course credit weight: Choose an item.

Course consent required: Choose an item.

Course description:

Meet type(s): Choose an item. Choose an item. Choose an item. Choose an item.

Primary meet type: Choose an item.

Delivery mode: Choose an item.

Requisites:

Special topics course: Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Currently, research seminar attendance is a degree requirement for MASc-Nanotechnology (at least 8) and for MEng in Mechanical and Mechatronics Engineering (at least 4), however nothing is currently specified for regular MASc in Mechanical and Mechatronics Engineering. For consistency with existing Master's degrees, the department of Mechanical and Mechatronics Engineering would like to add the attendance of at least 8 research seminars to the degree requirements. This will strengthen the research exposure of MASc students and build a stronger graduate community in the department of Mechanical and Mechatronics Engineering.

Form completed by: Cecile Devaud/Sarah Landy
Department/School approval date (mm/dd/yy): 23/02/22
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☒ Inactivate: Master's Seminar

Please remove the "Master's Seminar" milestone from the following program:
Master of Applied Science (MASc) in Mechanical and Mechatronics Engineering

☐ Revise: from Choose an item. to Choose an item.

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: Choose an item.

Course number:

Course ID:

Course title (max. 100 characters including spaces):

Course short title (max. 30 characters including spaces):

Grading basis: Choose an item.

Course credit weight: Choose an item.

Course consent required: Choose an item.

Course description:

Meet type(s): Choose an item. Choose an item. Choose an item. Choose an item.

Primary meet type: Choose an item.

Delivery mode: Choose an item.

Requisites:

Special topics course: Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Currently, there is no specified format of the research seminar that must be given by MASc students. In practice, the research seminar is given in front of the two thesis readers and supervisor (s) after they received and reviewed the thesis who ask questions about the thesis work. The department of Mechanical and Mechatronics Engineering wants to remove the existing MASc seminar milestone and formalize the format of the thesis examination that is already taken place in most cases, for improved clarity and quality. The new thesis oral exam will take the form of a defence with different categories for the decision. The proposed format closely follows what is in place in MASc – Civil and Environmental Engineering. The MASc thesis oral defence will be included in the existing Master's thesis milestone in the degree requirements.

Form completed by: Cecile Devaud/Sarah Landy
Department/School approval date (mm/dd/yy): 23/02/22
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

FACULTY OF ENVIRONMENT - GRADUATE STUDIES COMMITTEE

REPORT TO SENATE GRADUATE & RESEARCH COUNCIL
May 9th 2022

1. **Program Revisions for Approval**
    a. **Geography and Environmental Management**
        i. **MA in Geography**
            - Collaborative Aeronautics Program (CAP).
        ii. **MSc in Geography**
            - Collaborative Aeronautics Program (CAP).
        iii. **MES in Geography**
            - Collaborative Aeronautics Program (CAP).
        iv. **PhD in Geography**
            - Collaborative Aeronautics Program (CAP).

    b. **Environment, Resources and Sustainability**
        i. **MES in Social and Ecological Sustainability – MRP**
            - Work integrated leaning

2. **New Courses for Approval**
    a. **Planning**
        i. **PLAN 606: Modelling the City**
    b. **Environment, Resources and Sustainability**
        i. **ERS 620: Skills Identification and Career Development**

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 and Postdoctoral Affairs (GSPA).

Faculty: Environment

Program: Master of Arts (MA) in Geography - Aeronautics

Program contact name(s): Chris Fletcher

Form completed by: Chris Fletcher

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Geography and Environmental Management is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Arts (MA) in Geography - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Geography and Environmental Management is joining the CAP because many faculty members from the Department have research interest in aeronautics systems and related applications, particularly through the lens of sustainability and climate change. The Department has a strong and increasingly popular undergraduate aviation program; however, there are currently relatively few graduate students performing thesis research in these areas. Joining the CAP will provide a powerful new recruitment tool to attract graduate students to the Department wishing to conduct research into sustainable aviation and aeronautics. The CAP will allow current and future students in these fields to gain knowledge and support from CAP courses and researchers.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/environment/department-geography-and-environmental-management

Current MA in Geography Graduate Studies Academic Calendar content:	**Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content**:
MASTER OF ARTS (MA) IN GEOGRAPHY **Graduate research fields** • Environmental and Resource Management • Geomatics	**MASTER OF ARTS (MA) IN GEOGRAPHY - AERONAUTICS** ~~**Graduate research fields**~~ ~~• Environmental and Resource Management~~ ~~• Geomatics~~

Current MA in Geography Graduate Studies Academic Calendar content:	Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content:
• Human Geography **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Thesis option: ▪ Full-time: limit of six terms ▪ Part-time: limit of twelve terms o Master's Research Paper option: ▪ Full-time: limit of three terms ▪ Part-time: limit of six terms • **Program type** o Joint o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o Master's Research Paper **Admission requirements** • **Minimum requirements** o An honours undergraduate degree or equivalent with at least a 75% average. Normally, the undergraduate degree will be in Geography, but applications are welcomed from superior students regardless of background. However, students must demonstrate that they have the necessary background to pursue graduate work in their field of specialization. • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3	• ~~Human Geography~~ **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Thesis option: ▪ Full-time: limit of six terms ▪ Part-time: limit of twelve terms o Master's Research Paper option: ▪ Full-time: limit of three terms ▪ Part-time: limit of six terms • **Program type** o Collaborative ~~o Joint~~ o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o Master's Research Paper **Admission requirements** • **Minimum requirements** o An honours undergraduate degree or equivalent with at least a 75% average. Normally, the undergraduate degree will be in Geography, but applications are welcomed from superior students regardless of background. However, students must demonstrate that they have the necessary background to pursue graduate work in their field of specialization. • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3

Current MA in Geography Graduate Studies Academic Calendar content:	Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content:
○ Type of references: academic references are required unless a professional reference is specified. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Master's Students ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any 2 other GEOG courses that complement the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer. ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. ○ The coursework part of the program is designed to develop advanced understanding of issues relating to environmental studies, and also to provide students with training in additional methods/skills for their thesis research and its defence. Students will normally complete the 4 one-term	○ Type of references: academic references are required unless a professional reference is specified. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Master's Students ▪ Aeronautics core courses: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 602 Interdisciplinary Aeronautics Project ▪ ~~1 of the following foundation courses:~~ ▪ ~~GEOG 600 Foundations in Spatial Data Handling~~ ▪ ~~GEOG 620 Foundations in Human Geography~~ ▪ ~~GEOG 640 Foundations in Environmental Science~~ ▪ ~~GEOG 660 Foundations in Resource and Environmental Management~~ ▪ Any ~~2~~ other GEOG course~~s~~ that complement~~s~~ the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer. ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. ○ The coursework part of the program is designed to develop advanced

Current MA in Geography Graduate Studies Academic Calendar content:	Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content:
courses during their first year. • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer. **Master's Research Paper option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete the following 6 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Masters Students ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any 4 other GEOG courses that complement the student's graduate research field. Students may elect to take non-GEOG elective courses with	understanding of issues relating to environmental studies, and also to provide students with training in additional methods/skills for their thesis research and its defence. Students will normally complete the 4 one-term courses during their first year. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal applicable to Geography and Aeronautics that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis applicable to Geography and Aeronautics. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer. **Master's Research Paper option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses**

Current MA in Geography Graduate Studies Academic Calendar content:	Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content:
approval of the Graduate Officer. o Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. • **Master's Research Paper** o Each student will have a Supervisor and a Reader. The student will develop a research proposal for approval by their Supervisor, normally prior to the end of the first term. The research paper will normally be completed in the Spring (third) term. The paper should be approximately 12,000 words/50 pages in length. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer.	o Students must successfully complete the following 6 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Masters Students ▪ Aeronautics core courses: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 602 Interdisciplinary Aeronautics Project ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any ~~4~~ 2 other GEOG courses that complement the student's graduate research field. Students may elect to take non-GEOG elective courses with approval of the Graduate Officer. o Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Research Paper**

Current MA in Geography Graduate Studies Academic Calendar content:	Proposed MA in Geography - Aeronautics Graduate Studies Academic Calendar content:
	○ Each student will have a Supervisor and a Reader. The student will develop a research proposal for approval by their Supervisor, normally prior to the end of the first term. The research paper must be applicable to Geography and Aeronautics and will normally be completed in the Spring (third) term. The paper should be approximately 12,000 words/50 pages in length. • **Other requirements** ○ If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer.

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

Students currently registered in a Geography Master's program will have the option to transfer into the equivalent CAP Master's program. Such a transfer would normally occur before the end of the student's first year of study.

Department/School approval date (02/25/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/15/22
Faculty approval date (mm/dd/yy): 04/29/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Environment

Program: Master of Science (MSc) in Geography - Aeronautics

Program contact name(s): Chris Fletcher

Form completed by: Chris Fletcher

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Geography and Environmental Management is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Science (MSc) in Geography - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Geography and Environmental Management is joining the CAP because many faculty members from the Department have research interest in aeronautics systems and related applications, particularly through the lens of sustainability and climate change. The Department has a strong and increasingly popular undergraduate aviation program; however, there are currently relatively few graduate students performing thesis research in these areas. Joining the CAP will provide a powerful new recruitment tool to attract graduate students to the Department wishing to conduct research into sustainable aviation and aeronautics. The CAP will allow current and future students in these fields to gain knowledge and support from CAP courses and researchers.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/environment/department-geography-and-environmental-management

Current MSc in Geography Graduate Studies Academic Calendar content:	**Proposed MSc in Geography - Aeronautics Graduate Studies Academic Calendar content**:
MASTER OF SCIENCE (MSC) IN GEOGRAPHY **Graduate research fields** • Environmental Science	**MASTER OF SCIENCE (MSC) IN GEOGRAPHY - AERONAUTICS** ~~**Graduate research fields**~~ ~~• Environmental Science~~

Current MSc in Geography Graduate Studies Academic Calendar content:	Proposed MSc in Geography - Aeronautics Graduate Studies Academic Calendar content:
• Geomatics **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Normally, the formal requirements of the program are to be completed in two years. • **Program type** o Joint o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Registration option(s) information** o This program will not normally be offered on a part-time basis. In exceptional circumstances, students may assume part-time status after their formal course work has been completed. • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o Students must normally hold an Honours Bachelor of Science (BSc) degree. Students with an Honours Bachelor of Environmental Science (BES) or Bachelor of Arts (BA) degree in Physical Geography, Environmental or Earth Science, Geomatics, or the equivalent, will also be considered. Students must demonstrate that they have the necessary science background to pursue graduate work in their field of specialization. Students will have completed the undergraduate degree with an overall average of at	~~• Geomatics~~ **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Normally, the formal requirements of the program are to be completed in two years. • **Program type** o Collaborative ~~o Joint~~ o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Registration option(s) information** o This program will not normally be offered on a part-time basis. In exceptional circumstances, students may assume part-time status after their formal course work has been completed. • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o Students must normally hold an Honours Bachelor of Science (BSc) degree. Students with an Honours Bachelor of Environmental Science (BES) or Bachelor of Arts (BA) degree in Physical Geography, Environmental or Earth Science, Geomatics, or the equivalent, will also be considered. Students must demonstrate that they have the necessary science background to pursue graduate work in their field of specialization. Students will have completed the undergraduate degree with an overall average of at

Current MSc in Geography Graduate Studies Academic Calendar content:	Proposed MSc in Geography - Aeronautics Graduate Studies Academic Calendar content:

least 75%.
 	
• **Application materials**
  ○ Résumé
  ○ Supplementary information form
  ○ Transcript(s)
 	
• **References**
  ○ Number of references: 3
  ○ Type of references: at least 2 academic
 	
• **English language proficiency (ELP)** (if applicable)
	least 75%.
	
	• **Application materials**
	  ○ Résumé
	  ○ Supplementary information form
	  ○ Transcript(s)
	
	• **References**
	  ○ Number of references: 3
	  ○ Type of references: at least 2 academic
	
	• **English language proficiency (ELP)** (if applicable)

Degree requirements
 	
Thesis option:
 	
• **Graduate Academic Integrity Module (Graduate AIM)**
 	
• **Courses**
  ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course):
  ▪ GEOG 700 Professional Skills Development for Master's Students
  ▪ 1 of the following foundation courses:
  ▪ GEOG 600 Foundations in Spatial Data Handling
  ▪ GEOG 640 Foundations in Environmental Science
  ▪ Any 2 other GEOG courses that complement the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer.
  ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program.
  ○ The coursework part of the program is designed to develop advanced understanding of issues relating to environmental science and geomatics, and also to provide students with training in additional methods/skills for their thesis research and its defence.
	Degree requirements
	
	Thesis option:
	
	• **Graduate Academic Integrity Module (Graduate AIM)**
	
	• **Courses**
	  ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course):
	  ▪ GEOG 700 Professional Skills Development for Master's Students
	  ▪ Aeronautics core courses:
	  ▪ AVIA 601 Interdisciplinary Aeronautics
	  ▪ AVIA 602 Interdisciplinary Aeronautics Project
	  ~~▪ 1 of the following foundation courses:~~
	  ~~▪ GEOG 600 Foundations in Spatial Data Handling~~
	  ~~▪ GEOG 640 Foundations in Environmental Science~~
	  ▪ Any ~~2~~ other GEOG course~~s~~ that complement<u>s</u> the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer.
	  ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program.

Current MSc in Geography Graduate Studies Academic Calendar content:	Proposed MSc in Geography - Aeronautics Graduate Studies Academic Calendar content:
Students will normally complete the 4 one-term courses during their first year. • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o Fieldwork: many students will engage in fieldwork as part of their research. Several courses provide experience and training, to complement what most students will have obtained in their undergraduate degrees. Individual faculty also provide specialized training before and during fieldwork activity. Fieldwork is subject to environmental and other impact assessment through NSERC funding reviews, as well as research permit applications in many jurisdictions where students work, e.g., in the Yukon, Northwest Territories, or Nunavut.	o The coursework part of the program is designed to develop advanced understanding of issues relating to environmental science and geomatics, and also to provide students with training in additional methods/skills for their thesis research and its defence. Students will normally complete the 4 one-term courses during their first year. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal applicable to Geography and Aeronautics that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis applicable to Geography and Aeronautics. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o Fieldwork: many students will engage in fieldwork as part of their research. Several courses provide experience and training, to complement what most students will have obtained in their undergraduate degrees. Individual faculty also provide specialized training before and during fieldwork activity. Fieldwork is subject to environmental and other impact assessment through NSERC funding reviews, as well as research permit applications in many

Current MSc in Geography Graduate Studies Academic Calendar content:	Proposed MSc in Geography - Aeronautics Graduate Studies Academic Calendar content:
	jurisdictions where students work, e.g., in the Yukon, Northwest Territories, or Nunavut.

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

Students currently registered in a Geography Master's program will have the option to transfer into the equivalent CAP Master's program. Such a transfer would normally occur before the end of the student's first year of study.

Department/School approval date (02/25/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/15/22
Faculty approval date (mm/dd/yy): 04/29/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Environment

Program: Master of Environmental Studies (MES) in Geography - Aeronautics

Program contact name(s): Chris Fletcher

Form completed by: Chris Fletcher

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Geography and Environmental Management is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Environmental Studies (MES) in Geography - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Geography and Environmental Management is joining the CAP because many faculty members from the Department have research interest in aeronautics systems and related applications, particularly through the lens of sustainability and climate change. The Department has a strong and increasingly popular undergraduate aviation program; however, there are currently relatively few graduate students performing thesis research in these areas. Joining the CAP will provide a powerful new recruitment tool to attract graduate students to the Department wishing to conduct research into sustainable aviation and aeronautics. The CAP will allow current and future students in these fields to gain knowledge and support from CAP courses and researchers.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/environment/department-geography-and-environmental-management

Current MES in Geography Graduate Studies Academic Calendar content:	**Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content**:
MASTER OF ENVIRONMENTAL STUDIES (MES) IN GEOGRAPHY **Graduate research fields** • Environmental and Resource Management • Environmental Science	**MASTER OF ENVIRONMENTAL STUDIES (MES) IN GEOGRAPHY - AERONAUTICS** ~~**Graduate research fields**~~

Current MES in Geography Graduate Studies Academic Calendar content:	Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content:
• Geomatics • Human Geography **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Thesis option: ▪ Full-time: limit of six terms ▪ Part-time: limit of twelve terms o Master's Research Paper option: ▪ Full-time: limit of three terms ▪ Part-time: limit of six terms • **Program type** o Joint o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o Master's Research Paper **Admission requirements** • **Minimum requirements** o An honours undergraduate degree or equivalent with at least a 75% average. Normally, the undergraduate degree will be in Geography, but applications are welcomed from superior students regardless of background. However, students must demonstrate that they have the necessary background to pursue graduate work in their field of specialization. • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3	~~• Environmental and Resource Management~~ ~~• Environmental Science~~ ~~• Geomatics~~ • ~~Human Geography~~ **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Length of program** o Thesis option: ▪ Full-time: limit of six terms ▪ Part-time: limit of twelve terms o Master's Research Paper option: ▪ Full-time: limit of three terms ▪ Part-time: limit of six terms • **Program type** o <u>Collaborative</u> ~~o Joint~~ o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o Master's Research Paper **Admission requirements** • **Minimum requirements** o An honours undergraduate degree or equivalent with at least a 75% average. Normally, the undergraduate degree will be in Geography, but applications are welcomed from superior students regardless of background. However, students must demonstrate that they have the necessary background to pursue graduate work in their field of specialization. • **Application materials** o Résumé o Supplementary information form

Current MES in Geography Graduate Studies Academic Calendar content:	Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content:
○ Type of references: academic references are required unless a professional reference is specified. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Master's Students ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any 2 other GEOG courses that complement the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer. ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. ○ The coursework part of the program is designed to develop advanced understanding of issues relating to environmental studies, and also to provide students with training in additional methods/skills for their thesis research and its defence. Students will normally complete the 4 one-term	○ Transcript(s) • **References** ○ Number of references: 3 ○ Type of references: academic references are required unless a professional reference is specified. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must successfully complete the following 4 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Master's Students ▪ <u>Aeronautics core courses:</u> ▪ <u>AVIA 601 Interdisciplinary Aeronautics</u> ▪ <u>AVIA 602 Interdisciplinary Aeronautics Project</u> ▪ ~~1 of the following foundation courses:~~ ▪ ~~GEOG 600 Foundations in Spatial Data Handling~~ ▪ ~~GEOG 620 Foundations in Human Geography~~ ▪ ~~GEOG 640 Foundations in Environmental Science~~ ▪ ~~GEOG 660 Foundations in Resource and Environmental Management~~ ▪ Any ~~2~~ other GEOG course~~s~~ that complement<u>s</u> the student's graduate research field. Students may elect to take a non-GEOG elective course with approval of the Graduate Officer. ○ Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status

Current MES in Geography Graduate Studies Academic Calendar content:	Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content:
courses during their first year. • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer. **Master's Research Paper option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete the following 6 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Masters Students ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any 4 other GEOG courses that complement the student's graduate research field. Students may elect to take non-GEOG elective courses with	in the program, which may require that the student withdraw from the program. o The coursework part of the program is designed to develop advanced understanding of issues relating to environmental studies, and also to provide students with training in additional methods/skills for their thesis research and its defence. Students will normally complete the 4 one-term courses during their first year. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Thesis Proposal** o During the first year, students develop a thesis proposal applicable to Geography and Aeronautics that will be approved by their supervisor and committee, normally before the end of the first year. • **Master's Thesis** o Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis applicable to Geography and Aeronautics. Normally, students should complete and defend the thesis within two years of starting the program. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer. **Master's Research Paper option:**

Current MES in Geography Graduate Studies Academic Calendar content:	Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content:
approval of the Graduate Officer. o Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. • **Master's Research Paper** o Each student will have a Supervisor and a Reader. The student will develop a research proposal for approval by their Supervisor, normally prior to the end of the first term. The research paper will normally be completed in the Spring (third) term. The paper should be approximately 12,000 words/50 pages in length. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer.	• **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete the following 6 graduate level courses (0.50 unit weight per course): ▪ GEOG 700 Professional Skills Development for Masters Students ▪ Aeronautics core courses: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 602 Interdisciplinary Aeronautics Project ▪ 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management ▪ Any ~~4~~ 2 other GEOG courses that complement the student's graduate research field. Students may elect to take non-GEOG elective courses with approval of the Graduate Officer. o Failure to obtain a final grade of at least 70% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other

Current MES in Geography Graduate Studies Academic Calendar content:	Proposed MES in Geography - Aeronautics Graduate Studies Academic Calendar content:
	departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Research Paper** o Each student will have a Supervisor and a Reader. The student will develop a research proposal for approval by their Supervisor, normally prior to the end of the first term. The research paper must be applicable to Geography and Aeronautics and will normally be completed in the Spring (third) term. The paper should be approximately 12,000 words/50 pages in length. • **Other requirements** o If a student wishes to switch from the Thesis option to the Master's Research Paper option or vice versa, the change must be approved by the Graduate Officer.

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

Students currently registered in a Geography Master's program will have the option to transfer into the equivalent CAP Master's program. Such a transfer would normally occur before the end of the student's first year of study.

Department/School approval date (02/25/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/15/22
Faculty approval date (mm/dd/yy): 04/29/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Environment

Program: Doctor of Philosophy (PhD) in Geography - Aeronautics

Program contact name(s): Chris Fletcher

Form completed by: Chris Fletcher

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Geography and Environmental Management is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Doctor of Philosophy (PhD) in Geography - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Geography and Environmental Management is joining the CAP because many faculty members from the Department have research interest in aeronautics systems and related applications, particularly through the lens of sustainability and climate change. The Department has a strong and increasingly popular undergraduate aviation program; however, there are currently relatively few graduate students performing thesis research in these areas. Joining the CAP will provide a powerful new recruitment tool to attract graduate students to the Department wishing to conduct research into sustainable aviation and aeronautics. The CAP will allow current and future students in these fields to gain knowledge and support from CAP courses and researchers.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/environment/department-geography-and-environmental-management

Current PhD in Geography Graduate Studies Academic Calendar content:	**Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content**:
DOCTOR OF PHILOSOPHY (PHD) IN GEOGRAPHY **Graduate research fields** • Environmental and Resource Management • Environmental Science	**DOCTOR OF PHILOSOPHY (PHD) IN GEOGRAPHY - AERONAUTICS** ~~**Graduate research fields**~~ ~~• Environmental and Resource Management~~ ~~• Environmental Science~~

Current PhD in Geography Graduate Studies Academic Calendar content:	Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content:
• Geomatics • Human Geography **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Program type** o Doctoral o Joint o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o A Master's degree in geography or equivalent, with at least an 80% average in all graduate work. o Exceptional students may be allowed to enter the PhD program directly from the Master's program. Such students must have completed all Master of Arts (MA)/Master of Environmental Studies (MES)/Master of Science (MSc) requirements except the thesis, have demonstrated a superior academic record and satisfied other conditions (details of which can be obtained from the Director of the Program). • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3 o Type of references: academic references are required unless a professional reference is specified.	• ~~Geomatics~~ • ~~Human Geography~~ **Program information** • **Admit term(s)** o Fall o Winter • **Delivery mode** o On-campus • **Program type** o Collaborative o Doctoral o ~~Joint~~ o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o A Master's degree in geography or equivalent, with at least an 80% average in all graduate work. o Exceptional students may be allowed to enter the PhD program directly from the Master's program. Such students must have completed all Master of Arts (MA)/Master of Environmental Studies (MES)/Master of Science (MSc) requirements except the thesis, have demonstrated a superior academic record and satisfied other conditions (details of which can be obtained from the Director of the Program). • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3 o Type of references: academic references are required unless a professional reference is specified.

Current PhD in Geography Graduate Studies Academic Calendar content:	Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content:
• **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete the following graduate level courses (0.50 unit weight per course): ▪ GEOG 800 Professional Skills Development for Doctoral Students ▪ Normally 1 of the following foundation courses: ▪ GEOG 600 Foundations in Spatial Data Handling ▪ GEOG 620 Foundations in Human Geography ▪ GEOG 640 Foundations in Environmental Science ▪ GEOG 660 Foundations in Resource and Environmental Management o Additional coursework may be assigned subject to the needs of individual students. o Failure to obtain a final grade of at least 77% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC). o In addition to the University-level PhD Comprehensive Examination minimum requirements, students in the PhD in Geography program are also required to meet the following requirements: ▪ The Comprehensive Examination includes both a	• **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete the following graduate level courses (0.50 unit weight per course): ▪ GEOG 800 Professional Skills Development for Doctoral Students ▪ Aeronautics core courses: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 802 Interdisciplinary Aeronautics Project - PhD Level o Students who have already completed AVIA 601 and AVIA 602 as part of their Masters Aeronautics degree, must complete the following course requirements: ▪ GEOG 800 Professional Skills Development for Doctoral Students ▪ AVIA 802 Interdisciplinary Aeronautics Project - PhD Level or 1 elective graduate course that is applicable to aeronautics (approved by their supervisor with support from the Director of the CAP program) ~~▪ Normally 1 of the following foundation courses:~~ ~~▪ GEOG 600 Foundations in Spatial Data Handling~~ ~~▪ GEOG 620 Foundations in Human Geography~~ ~~▪ GEOG 640 Foundations in Environmental Science~~ ~~▪ GEOG 660 Foundations in Resource and Environmental Management~~

Current PhD in Geography Graduate Studies Academic Calendar content:	Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content:
written and an oral component. Normally the Examination involves the student writing answers to a question or questions over a period of three weeks. The answer(s) will not exceed 10,000 words, excluding the bibliography, abstract, figures and tables. In the oral component of the Examination, which normally lasts no longer than three hours, the student defends the written document. The topics to be covered and the format of the Examination are determined by the student's Comprehensive Examination Committee, in consultation with the student. With the approval of the Waterloo-Laurier Graduate Program in Geography Committee, alternative formats for the Comprehensive Examination process may be permitted, provided they meet the objectives of the Comprehensive Examination. ▪ The Comprehensive Examining Committee will consist of the student's Advisor and three additional Examiners, one of whom will be from outside the Waterloo-Laurier Graduate Program in Geography (normally, this person will be internal to the University of Waterloo). The committee must contain at least two members of the Waterloo-Laurier Graduate Program in Geography. At least one member of the committee must be from the Geography Department at the University of Waterloo or Wilfred Laurier University. • **PhD Thesis Proposal** o Students develop a thesis proposal that will be approved by their Supervisor and Comprehensive Examining Committee, normally before the end of the second year. • **PhD Thesis**	o Additional coursework may be assigned subject to the needs of individual students. o Failure to obtain a final grade of at least 77% in each course will result in an automatic review of the student's status in the program, which may require that the student withdraw from the program. o <u>This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602/802).</u> • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC). o In addition to the University-level PhD Comprehensive Examination minimum requirements, students in the PhD in Geography program are also required to meet the following requirements: ▪ The Comprehensive Examination includes both a written and an oral component. Normally the Examination involves the student writing answers to a question or questions over a period of three weeks. The answer(s) will not exceed 10,000 words, excluding the bibliography, abstract, figures and tables. In the oral component of the Examination, which normally lasts no longer than three hours, the student defends the written document. The topics to be covered and the format of the Examination are determined by the student's

Current PhD in Geography Graduate Studies Academic Calendar content:	Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content:
○ Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis. Normally, students should complete and defend the thesis within four years of starting the program.	Comprehensive Examination Committee, in consultation with the student. With the approval of the Supervisor and Graduate Officer ~~Waterloo-Laurier Graduate Program in Geography Committee~~, alternative formats for the Comprehensive Examination process may be permitted, provided they meet the objectives of the Comprehensive Examination. ▪ The Comprehensive Examining Committee will consist of the student's Advisor and three additional Examiners, one of whom ~~will be from~~ must have a primary appointment outside the ~~Waterloo-Laurier Graduate Program in Geography~~ Department of Geography and Environmental Management (normally, this person will be internal to the University of Waterloo). The committee must contain at least ~~two~~ one member~~s~~ with a primary appointment inside the Department of Geography and Environmental Management ~~of the Waterloo-Laurier Graduate Program in Geography. At least one member of the committee must be from the Geography Department at the University of Waterloo or Wilfred Laurier University~~. • **PhD Thesis Proposal** ○ Students develop a thesis proposal applicable to Geography and Aeronautics that will be approved by their Supervisor and Comprehensive Examining Committee, normally before the end of the second year. • **PhD Thesis** ○ Upon approval of the thesis proposal, students will then proceed to the research and writing of the thesis applicable to Geography and Aeronautics. Normally, students should

Current PhD in Geography Graduate Studies Academic Calendar content:	Proposed PhD in Geography - Aeronautics Graduate Studies Academic Calendar content:
	complete and defend the thesis within four years of starting the program.

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

Students currently registered in the Geography PhD program will have the option to transfer into the CAP PhD program. Such a transfer would normally occur before the end of the student's second year of study.

Department/School approval date (02/25/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/15/22
Faculty approval date (mm/dd/yy): 04/29/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Environment

Program: Master of Environmental Studies (MES) in Social and Ecological Sustainability

Program contact name(s): Derek Armitage

Form completed by: Derek Armitage

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Adding a new Master's Research Paper with Internship study option to the program.

Is this a major modification to the program? Yes

Rationale for change(s):

*The MES in Social and Ecological Sustainability program has been generating a steady stream of high-calibre, multi-disciplinary Master's graduates for over two decades. In recent years, the program has been augmented by the establishment of a "Master's Research Paper" (MRP) study option with a view to responding to student demands for a highly focused and intensive program without undertaking the more traditional thesis study option stream. Student and employer market trends increasingly point to the desire for work-integrated-learning (WIL) approaches at the graduate student level giving rise to what we see as a significant opportunity to augment our graduate program with a renewed emphasis on providing MES MRP students in SERS with a well-supported and rewarding graduate WIL opportunity. This WIL opportunity will have a particular focus on bridging environment, resource and sustainability science and policy, and thus provides a unique offering within ENV. Key changes include the addition of a research-focused internship opportunity with several core program partners in the sustainability field to the existing MES MRP study option, the addition of a regular course on professional skills development and career preparation implemented in conjunction with WIL Programs in Cooperative and Experiential Education (CEE), and the alignment of the major milestone - the MRP - with the internship opportunity. We envision the development of strong relationships with a core group of policy partners to facilitate placement of students, and an eventual steady state of 8-10 MES MRP (Science-Policy Internship) students per year (*this option will not replace the current MES MRP study option). Students will be responsible for securing an internship but where possible, SERS graduate faculty will identify and help organize internships with support from CEE.*

Proposed effective date: Term: Fall Year: 2022

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/environment/school-environment-resources-and-sustainability/master-environmental-studies-mes-social-and-ecological-sustainability

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
MASTER OF ENVIRONMENTAL STUDIES (MES) IN SOCIAL AND ECOLOGICAL SUSTAINABILITY **Graduate research fields** • Resource Analysis and Stewardship • Socio-Ecosystem Function and Renewal • Sustainability Policy and Governance **Program information** • Admit term(s) o Fall • Delivery mode o On-campus • Length of program o Thesis option: The minimum period of full-time enrolment in the thesis option is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of six terms (two years) for full-time study or within 15 terms (five years) for part-time study. Most full-time students complete their course requirements within their first two terms and are prepared for thesis research in their third term. Continuous enrolment is required. o Master's Research Paper option: The minimum period of full-time enrolment is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of four terms. Most full-time students complete their course requirements within their first two terms and are prepared to begin Master's Research Paper research in their third term. Continuous enrolment is required. • Program type o Master's o Research • Registration option(s) o Full-time o Part-time • Study option(s)	**MASTER OF ENVIRONMENTAL STUDIES (MES) IN SOCIAL AND ECOLOGICAL SUSTAINABILITY** **Graduate research fields** • Resource Analysis and Stewardship • Socio-Ecosystem Function and Renewal • Sustainability Policy and Governance **Program information** • Admit term(s) o Fall • Delivery mode o On-campus • Length of program o Thesis option: The minimum period of full-time enrolment in the thesis option is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of six terms (two years) for full-time study or within 15 terms (five years) for part-time study. Most full-time students complete their course requirements within their first two terms and are prepared for thesis research in their third term. Continuous enrolment is required. o Master's Research Paper option: The minimum period of full-time enrolment is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of four terms. Most full-time students complete their course requirements within their first two terms and are prepared to begin Master's Research Paper research in their third term. Continuous enrolment is required. o <u>Master's Research Paper with Internship option: The minimum period of full-time enrolment is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of four terms. Most full-time students complete their course requirements within their first two terms and are prepared to participate in the Internship activity in</u>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
○ Thesis ○ Master's Research Paper **Admission requirements** • Minimum requirements ○ Students must possess an Honours Bachelor degree or its equivalent in some environmentally related field, with at least a 75% average in the last two years. ○ The equivalent of one year of related work experience is strongly recommended. • Application materials ○ Résumé ○ Supplementary information form ○ Transcript(s) • References ○ Number of references: 2 ○ Type of references: academic • English language proficiency (ELP) (if applicable) **Degree requirements** **Thesis option:** • Graduate Academic Integrity Module (Graduate AIM) • Courses ○ Required courses ▪ ERS 680 Sustainability Foundations (Fall) ▪ ERS 681 Sustainability Applications (Winter) ▪ ERS 669 Research Design and Methods (Winter) ○ Elective courses ▪ Students must complete 1 elective graduate course. ○ Students must maintain an academic average of at least 75%. • Research Skills Seminar ○ Attendance and participation at a Panel on Research Excellence to be held at the end of November of each year. • Master's Thesis	their third term. The Master's Research Paper will normally take place in the third and/or fourth term (in conjunction with the Internship opportunity), along with completion of any remaining milestones. Continuous enrolment is required. • Program type ○ Master's ○ Research • Registration option(s) ○ Full-time ○ Part-time • Study option(s) ○ Thesis ○ Master's Research Paper **Admission requirements** • Minimum requirements ○ Students must possess an Honours Bachelor degree or its equivalent in some environmentally related field, with at least a 75% average in the last two years. ○ The equivalent of one year of related work experience is strongly recommended. • Application materials ○ Résumé ○ Supplementary information form ○ Transcript(s) • References ○ Number of references: 2 ○ Type of references: academic • English language proficiency (ELP) (if applicable) **Degree requirements** **Thesis option:** • Graduate Academic Integrity Module (Graduate AIM) • Courses ○ Required courses

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
○ Completion and successful defence of a Master's Thesis. **Master's Research Paper option:** • Graduate Academic Integrity Module (Graduate AIM) • Courses ○ Required courses ▪ ERS 669 Research Design and Methods (Winter) ▪ ERS 680 Sustainability Foundations (Fall) ▪ ERS 681 Sustainability Applications (Winter) ○ Elective courses ▪ Students must complete 3 elective graduate courses. ▪ At least 2 of the electives must be from the School of Environment, Resources and Sustainability. ○ Students must maintain an academic average of at least 75%. • Research Skills Seminar ○ Attendance and participation at a Panel on Research Excellence to be held at the end of November of each year. • Master's Research Paper ○ Acceptance of a Master's Research Paper to be evaluated by the student's advisor and one commit…ee member.	▪ ERS 680 Sustainability Foundations (Fall) ▪ ERS 681 Sustainability Applications (Winter) ▪ ERS 669 Research Design and Methods (Winter) ○ Elective courses ▪ Students must complete 1 elective graduate course. ○ Students must maintain an academic average of at least 75%. • Research Skills Seminar ○ Attendance and participation at a Panel on Research Excellence to be held at the end of November of each year. • Master's Thesis ○ Completion and successful defence of a Master's Thesis. **Master's Research Paper option:** • Graduate Academic Integrity Module (Graduate AIM) • Courses ○ Required courses ▪ ERS 669 Research Design and Methods (Winter) ▪ ERS 680 Sustainability Foundations (Fall) ▪ ERS 681 Sustainability Applications (Winter) ○ Elective courses ▪ Students must complete 3 elective graduate courses. ▪ At least 2 of the electives must be from the School of Environment, Resources and Sustainability. ○ Students must maintain an academic average of at least 75%. • Research Skills Seminar ○ Attendance and participation at a Panel on Research Excellence to be held at the end of November of each year. • Master's Research Paper ○ Acceptance of a Master's Research Paper to be evaluated by the student's advisor and one committee member.

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

	Master's Research Paper with Internship option:
	
	The Master's Research Paper with Internship option will enable students to combine a graduate research milestone within a 'work-integrated-learning' experience. The internship opportunity, related coursework and milestones are designed to facilitate training of graduate students to bridge science and policy domains to solve complex sustainability challenges. Students who are unable to secure an internship placement will be able to change to one of the other study options listed above.
	
	• Graduate Academic Integrity Module (Graduate AIM)
	
	• Courses
	  ○ Required courses
	  ▪ ERS 620 Skills Identification and Career Development
	  ▪ ERS 669 Research Design and Methods (Winter)
	  ▪ ERS 680 Sustainability Foundations (Fall)
	  ▪ ERS 681 Sustainability Applications (Winter)
	  ○ Elective courses
	  ▪ Students must complete 2 elective graduate courses.
	  ▪ At least 1 of the electives will normally be from the School of Environment, Resources and Sustainability.
	  ○ Students must maintain an academic average of at least 75%.
	
	• Research Skills Seminar
	  ○ Attendance and participation at a Panel on Research Excellence to be held at the end of November of each year.
	
	• Master's Internship
	  ○ The internship should be completed in 12-16 weeks with a minimum of 420 hours with an approved partner organization. Internships will normally take place in the third term of study and following completion of the core and elective courses. Ultimate responsibility to secure an internship rests with the student but SERS graduate faculty will identify and help organize internships where possible. Internships are

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
	research focused. The focus of the internship-based Major Research Paper will vary depending on partner organization needs and interests but will be 'co-developed' by the host, the student and faculty supervisor. Internship activities are intended to form the basis of the Master's Research Paper in a manner that meets all MES standards and requirements while simultaneously advancing student professional development and the interests of the host organization. • Master's Research Paper ○ Acceptance of a Master's Research Paper to be evaluated by the student's advisor and one committee member.

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

No students currently enrolled in the MES MRP option will be impacted by these changes. No confirmation of new students specifically for this new option will occur until approvals have been obtained.

Department/School approval date (mm/dd/yy): 04/11/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/16/22
Faculty approval date (mm/dd/yy): 04/29/22
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. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Environment

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: PLAN

Course number: 606

Course ID:

Course title (max. 100 characters including spaces): Modelling the City

Course short title (max. 30 characters including spaces): Modelling the City

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: This course examines the use of computer modeling and simulation in the realm of urban analysis and forecasting, with the goal of understanding urban land-use change trajectories. Topics include an overview of the drivers and consequences in urban land-use change, the role of models, an overview of current methodological approaches, and an examination of urban simulation models as used in the development of urban policies and official plans. This course provides an applied learning environment in which students will gain experience in the use of spatial (GIS) modeling approaches.

Meet type(s): Lecture Tutorial Lab Choose an item.

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: PLAN 281 and ENVS 278 or equivalent (anti-requisites PLAN 416 and PLAN 674 topic 34)

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:
Sections combined/held with: PLAN 416

Rationale for request: The “Modeling the City” course is an elective that has been taught as a graduate special topics course in 2011, 2012, 2013, 2014, 2016, and 2019, held with an undergraduate section. It received undergraduate approval as Plan 416 in 2012. This course has been taken by many master’s and PhD students and supported the thesis research of many graduate students.

Currently the overall course is being revised to include “healthy cities” topics, in addition to the course’s historical focus on land-use change and transportation systems. This change will allow the course to support the CIHR SMART healthy cities graduate training program as an elective.

Form completed by:
Department/School approval date (mm/dd/yy): 02/23/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/11/22
Faculty approval date (mm/dd/yy): 04/29/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Environment

Effective date: Term: Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ERS

Course number: 620

Course ID:

Course title (max. 100 characters including spaces): Skills Identification and Career Development

Course short title (max. 30 characters including spaces): Skills ID & Career Development

Grading basis: Credit/No Credit

Course credit weight: 0.50

Course consent required: Department

Course description: This course leads students through resources and activities that provide them with the tools to be competitive in an employment context, and prepare them for a successful career in the environment, resource and sustainability science-policy context. Course material will also help prepare students for the research internship component of their program and provide students with an opportunity to support professional work-integrated-learning opportunities. Selected activities include: how to create personalized application packages; demonstrate that developing professional skills is of equal importance to developing technical ones;

provide strategies to help students make the most of workplace opportunities and challenges; develop their ability to critically self-reflect and plan for professional growth.

.

Meet type(s): Lecture Choose an item.

Primary meet type: Lecture

Delivery mode: Only offered online

Requisites:

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

SERS is creating a regular course that aims to prepare students involved in the MRP internship option with career development and professional skills appropriate for an internship placement. Course modules and a capstone workshop will also create an opportunity for formal reflection on learning processes and outcomes associated with work integrated learning activities

Form completed by: Derek Armitage
Department/School approval date (mm/dd/yy): 04/11/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/16/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

MEMORANDUM

TO: Kathy Winter, Secretary, Senate Graduate and Research Council

FROM: Tracy Taves, Faculty Graduate Administrator, Health

cc: Brian Laird, Associate Dean, Graduate Studies

DATE: April 11, 2022

SUBJECT: **Health Faculty Graduate Studies Committee (FGSC) Report to Senate Graduate and Research Council**

The attached report was approved by Health Faculty Council on March 25, 2022, reviewed by Trevor Clews and is now being forwarded to Senate Graduate & Research Council for inclusion on the agenda for the next meeting.

Thank you!

From: **Faculty of Health Graduate Studies Committee (January 19 & February 23, 2022); Admin Council (February 9 & March 23, 2022)**

To: **Faculty Council (March 25, 2022)**

Graduate calendar changes for Faculty of Health

1. MILESTONE CHANGES

1.1 School of Social Work* effective ~~Spring 2022~~ Fall 2022

1.1.1 **Motion:** To revise the Master's Seminar **to** Master's Integration Seminar and Capstone.

Rationale: Feedback from MSW students derived from the MSW Curriculum Survey, MSW student representatives on the MSW Program Committee, and through informal discussion with MSW students indicate repetition between the requirements of the Master's Seminar Presentation (Capstone) milestone and Master's Seminar (Integration Seminar) milestone. For example, both milestones rely heavily on the CASWE Standards of Accreditation – Core Learning Objectives (2014), with overlap in reflective activities related to eight (8) of the nine (9) capstone "competencies" and integration seminar "classrooms."

While the overall goals of the milestones differ, with the Capstone attending to students' overall MSW learning journey (inclusive of academic courses, practicum, life events and experiences, etc.) and the Integration Seminar milestone attending more specifically to the integration of theory and practice vis-à-vis practicum, the consolidation of the Capstone and Integration Seminar holds the potential to cover the scope of both milestones, addressing the overlap of milestone content and offering students a deep learning opportunity, while avoiding repetition. Both milestones will be 'housed' in the same LEARN shell – likely in the existing Capstone shell, using PebblePad to create an Integration Seminar Workbook.

The Master's Integration Seminar and Capstone will include two inter-related MSW milestones: 1) the Integration Seminar; and 2) the Capstone. As inter-related milestones, the Integration Seminar and Capstone offer a scaffolding approach to critically reflecting on students' MSW learning journeys. The Integration Seminar supports a continuous process of self-directed critical reflection that brings practice experiences in the field into conversation with the MSW course content. This process contributes to a summative reflection on the MSW learning journey through the completion of the Capstone project. The Capstone project draws on arts-based pedagogy to move beyond cognitive processes of critical reflection to support holistic engagement with emotions, experiences, and knowledges, etc. that have been meaningful to students' MSW learning journeys.

This milestone should be revised for the following program:
Master of Social Work (MSW)

1.1.2 **Motion:** To inactivate the Master's Seminar Presentation.

Rationale: Feedback from MSW students derived from the MSW Curriculum Survey, MSW student representatives on the MSW Program Committee, and through informal discussion with MSW students indicate repetition between the requirements of the Master's Seminar Presentation (Capstone) milestone and Master's Seminar (Integration Seminar) milestone. For example, both milestones rely heavily on the CASWE Standards of Accreditation – Core Learning Objectives (2014), with overlap in reflective activities related to eight (8) of the nine (9) capstone "competencies" and integration seminar "classrooms."

The inactivation of the Capstone milestone is intended to address repetition in the MSW curriculum between the Integration Seminar and the Capstone. The Capstone milestone will continue as a MSW program requirement; however, it will be included in the MSW program as a combined element of the Integration Seminar. That is, an updated version of the Integration Seminar that incorporates new core learning objectives from the Canadian Association of Social Work Education Standards for Accreditation and addresses repetition between the two milestones will be consolidated within the revised Integration Seminar.

This milestone should be removed from the following program:
Master of Social Work (MSW)

2. COURSE CHANGES

2.1 School of Social Work* effective ~~Spring 2022~~ Fall 2022

2.2.1 **Motion:** To approve a change to the course title and course short title for SWR 610R.

Current title: Substance Abuse & Chemical Dependency
Revised title: Interprofessional Approaches to Substance Use and Misuse and Mental Health

Current short title: Substance Abuse & Chem Depend
Revised short title: Substance Use & Misuse and MH

Rationale: The proposed change to SWK 610R, Substance Abuse and Chemical Dependency, includes a title change to, SWK 610R, Interprofessional Approaches to Substance Use and Misuse and Mental Health. The new title reflects current practice language used in social work and pharmacy respectively, as well as underscores the interprofessional focus of the course content and delivery.

2.2.2 **Motion:** To approve a change to the course title, course short title, and course description for HLTH 644/SWR 654R.

Current title: Indigenous Health and Social Justice
Revised title: Indigenous Wellbeing, Health, and Social Justice

Current short title: Indigenous Health Justice
Revised short title: Indigenous Wellbeing

Current course description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous health with a focus on social justice. Students will learn about health inequities that face First Nations, Métis, and Inuit Peoples in rural and urban contexts within Canada as well as Indigenous Peoples internationally who have been impacted by processes of colonization. The course will critically examine how health status indicators are measured and used as well as link determinants of Indigenous Peoples' health to historical and ongoing colonial priorities and practices. Some of the disparities in health and social issues, access to care, and systemic challenges including racism experienced by Indigenous Peoples in different regions and contexts will be shared as points for discussion. An intersectionality lens will be applied in consideration of the unique health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit people. Innovative approaches to healing and community-based ethical practices will also be profiled in social work and health care delivery, research, policy, and programming. The perspectives of Indigenous Peoples will be highlighted in this course, through a variety of readings, film and other arts-based narratives, including Indigenous scholars and community activists in the delivery and discussion of course materials.

Revised course description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous wellbeing and health through a social justice lens. The course critically links determinants of Indigenous Peoples' wellbeing and health to historical and ongoing colonial priorities and

practices. Disparities in health and social issues, access to care, and systemic challenges, including racism experienced by Indigenous Peoples in different regions and contexts, are shared as points for discussion and reflection. An intersectionality lens is applied in consideration of the unique wellbeing and health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit Peoples. Indigenous approaches to science, healing, and community-based ethical practices are also profiled in social work and health care delivery, research, policy, and programming. The knowledges, values, and perspectives of Indigenous Peoples are highlighted throughout this course, incorporated within a variety of resources including readings, film and other arts-based narratives that include Indigenous scholars and community activists, in the delivery of course content and assignments. This course was created in consultation with a local Indigenous Advisory Circle that included community-based Indigenous Elders, health leaders, social workers, and academics involved in Indigenous initiatives and research. (Note: This is an online course).

Rationale: The proposed change to the title and description of HLTH 644/SWK 654R is to more accurately reflect the content and intentions of the course post development.

3. PROGRAM CHANGES

3.1 Kinesiology and Health Sciences*

3.1.1 **Motion**: To articulate the criteria for students to obtain a graduate research field designation on their transcript -- Biomechanics, Neuroscience or Physiology and Nutrition, effective ~~Spring 2022.~~ Fall 2022

Rationale: The Department of Kinesiology and Health Sciences would like students to obtain a recognized “Graduate Research Field” when they graduate. This recognition will enhance the marketability of graduates by signifying to employers and other graduate schools that Kinesiology students have a particular research area of expertise beyond the broad knowledge expectations of their degrees.

In graduate programs, graduate research fields refer to a research area of concentration that is related to the collective strengths of the program’s faculty. Kinesiology has identified a particular need to further specify and recognize existing areas of strength within its graduate programs. When students are considering their applications to MSc and PhD programs in Kinesiology, they specify a research field and supervisor based on their degree path. Their degree should also recognize this graduate research field on student transcripts. Student feedback has been very positive for this to happen for some time.

3.1.2 **Motion**: The Department of Kinesiology and Health Sciences is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Science (MSc) in Kinesiology - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate and Quality Council approval, effective Fall 2022.

Rationale: The Department of Kinesiology and Health Sciences (KHS) is joining the CAP because it offers novel learning experiences for students who wish to bridge the domains of KHS and Aeronautics research and application. The multidisciplinary approaches underlying the program will aid students in generating impactful, integrative ideas/solutions, and will enhance advancement opportunities for career and research perspectives.

3.1.3 **Motion**: The Department of Kinesiology and Health Sciences is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Doctor of Philosophy (PhD) in Kinesiology - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate and Quality Council approval, effective Fall 2022.

Rationale: The Department of Kinesiology and Health Sciences (KHS) is joining the CAP because it offers novel learning experiences for students who wish to bridge the domains of KHS and Aeronautics research and application. The multidisciplinary approaches underlying the program will aid students in generating impactful, integrative ideas/solutions, and will

enhance advancement opportunities for career and research perspectives.

3.1.4 **Motion**: Changing the PhD and MSc program names to align with our unit name which recently changed from the "Department of Kinesiology" to the "Department of Kinesiology and Health Sciences", effective Fall 2022.

Rationale: Aligning our degree designations with our recent departmental name change from the Department of Kinesiology to the Department of Kinesiology and Health Sciences.

4.1 School of Public Health Sciences* effective ~~Spring 2022~~ Fall 2022

4.1.1 **Motion**: To remove the environmental health sciences concentration option from the courses section of the Graduate Studies Academic Calendar.

Rationale: The environmental health sciences concentration in the Master of Public Health program requires students to take two courses that are not currently offered: HLTH 624 Environmental Toxicology in Public Health and HLTH 634 Environmental Epidemiology for Public Health. While HLTH 634 is expected to return shortly, we do not have a timeline for the return of HLTH 624. Therefore, this concentration cannot currently be offered to students and we do not have an estimate of whether it will be possible to offer this concentration in the future.

4.1.2 **Motion**: To change the PhD and MSc program names to align with the name of the School which changed from the "School of Public Health and Health Systems" to the "School of Public Health Sciences" earlier in 2021.

Rationale: In September 2021, the School of Public Health and Health Systems changed their name to the School of Public Health Sciences. We are proposing to change the names of our Graduate Research Programs (the MSc and PhD) to align with the new name of the school.

5. NEW COURSES

5.1 Kinesiology and Health Sciences* effective Fall 2022

5.1.1 **Motion**: To add **KIN 658: Physical Activity and Cognition**.

Rationale: There is growing interest in the department and in the research community on the effects of physical activity on cognitive function, and a growing demand of national and international advocates to accommodate the needs of people living with cognitive impairment in occupational, social, and clinical settings. The course will be suitable to thesis-based graduate students who are interested effects of exercise on cognitive function or in examining movement or interventions among people with cognitive disorders. The course would also be of interest to course-based students interested in exercise or other clinical practice among people with or at risk for cognitive disorders.

5.1.1 Motion: To add KIN 659: Wearable Technology.

Rationale: The KHS Graduate Committee completed a curriculum review, and noted a gap in the graduate course offerings in this domain. This course was developed and offered as an ‘Selected Topics” course – enrolment and feedback were positive. The current proposal would formalize this as a graduate course in the KHS department.

***attachment**

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Health

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☐ Inactivate:

☒ Revise: from Master's Seminar to Master's Integration Seminar and Capstone

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code:

Course number:

Course ID:

Course title (max. 100 characters including spaces):

Course short title (max. 30 characters including spaces):

Grading basis:

Course credit weight:

Course consent required:

Course description:

Meet type(s): Lecture

Primary meet type:

Delivery mode:

Requisites:

Special topics course: Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with: Sections combined/held with:

Rationale for request:

Feedback from MSW students derived from the MSW Curriculum Survey, MSW student representatives on the MSW Program Committee, and through informal discussion with MSW students indicate repetition between the requirements of the Master's Seminar Presentation (Capstone) milestone and Master's Seminar (Integration Seminar) milestone. For example, both milestones rely heavily on the CASWE Standards of Accreditation – Core Learning Objectives (2014), with overlap in reflective activities related to eight (8) of the nine (9) capstone "competencies" and integration seminar "classrooms."

While the overall goals of the milestones differ, with the Capstone attending to students' overall MSW learning journey (inclusive of academic courses, practicum, life events and experiences, etc.) and the Integration Seminar milestone attending more specifically to the integration of theory and practice vis-à-vis practicum, the consolidation of the Capstone and Integration Seminar holds the potential to cover the scope of both milestones, addressing the overlap of milestone content and offering students a deep learning opportunity, while avoiding repetition. Both milestones will be 'housed' in the same LEARN shell – likely in the existing Capstone shell, using PebblePad to create an Integration Seminar Workbook.

The Master's Integration Seminar and Capstone will include two inter-related MSW milestones: 1) the Integration Seminar; and 2) the Capstone. As inter-related milestones, the Integration Seminar and Capstone offer a scaffolding approach to critically reflecting on students' MSW learning journeys. The Integration Seminar supports a continuous process of self-directed critical reflection that brings practice experiences in the field into conversation with the MSW course content. This process contributes to a summative reflection on the MSW learning journey through the completion of the Capstone project. The Capstone project draws on arts-based pedagogy to move beyond cognitive processes of critical reflection to support holistic engagement with emotions, experiences, and knowledges, etc. that have been meaningful to students' MSW learning journeys.

This milestone should be revised for the following program:
Master of Social Work (MSW)

Form completed by: Andrea Daley
Department/School approval date (mm/dd/yy): 12/15/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 01/10/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Health

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☐ Inactivate:

☐ Revise: from to

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Changing the Course title.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: SWK

Course number: 610R

Course ID: 015357

Course title (max. 100 characters including spaces):

Current title: Substance Abuse & Chemical Dependency
Revised title: Interprofessional Approaches to Substance Use and Misuse and Mental Health

Course short title (max. 30 characters including spaces):

Current title: Substance Abuse & Chem Depend
Revised title: Substance Use & Misuse and MH

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description:

This course serves as an overview of addiction, chemical abuse and chemical dependency and how social workers and pharmacists can independently or as a member of an interprofessional health team impact those affected. Topics include prevention, identification, treatment options, clinical aspects of treatment, and an understanding of support systems available for those in recovery. (Note: This is an online course).

Meet type(s): Lecture Online

Primary meet type: Lecture

Delivery mode: Only offered online

Requisites: SWK Masters Students Only / Antireq: SWK 609R

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with: Sections combined/held with: PHARM 375

Rationale for request:

The proposed change to SWK 610R Substance Abuse and Chemical Dependency includes a title change to, SWK 610R Interprofessional Approaches to Substance Use and Misuse and Mental Health. The new title reflects current practice language used in social work and pharmacy respectively, as well as underscores the interprofessional focus of the course content and delivery.

Form completed by: Andrea Daley
Department/School approval date (mm/dd/yy): 11/17/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 01/06/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO

Senate Graduate & Research Council
Graduate Studies Course/Milestone Form

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Health

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☒ Inactivate: Master's Seminar Presentation

☐ Revise: from to

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code:

Course number:

Course ID:

Course title (max. 100 characters including spaces):

Course short title (max. 30 characters including spaces):

Grading basis:

Course credit weight:

Course consent required:

Course description:

Meet type(s):

Primary meet type:

Delivery mode:

Requisites:

Special topics course: Yes ☐ No ☐

Cross-listed course: Yes ☐ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with: Sections combined/held with:

Rationale for request:

Feedback from MSW students derived from the MSW Curriculum Survey, MSW student representatives on the MSW Program Committee, and through informal discussion with MSW students indicate repetition between the requirements of the Master's Seminar Presentation (Capstone) milestone and Master's Seminar (Integration Seminar) milestone. For example, both milestones rely heavily on the CASWE Standards of Accreditation – Core Learning Objectives (2014), with overlap in reflective activities related to eight (8) of the nine (9) capstone "competencies" and integration seminar "classrooms."

The inactivation of the Capstone milestone is intended to address repetition in the MSW curriculum between the Integration Seminar and the Capstone. The Capstone milestone will continue as a MSW program requirement; however, it will be included in the MSW program as a combined element of the Integration Seminar. That is, an updated version of the Integration Seminar that incorporates new core learning objectives from the Canadian Association of Social Work Education Standards for Accreditation and addresses repetition between the two milestones will be consolidated within the revised Integration Seminar.

This milestone should be removed from the following program:
Master of Social Work (MSW)

Form completed by: Andrea Daley
Department/School approval date (mm/dd/yy): 12/15/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 01/10/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Health

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☐ Inactivate:

☐ Revise: from to

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Changing the Course title and Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: HLTH

Course number: 644

Course ID: 016294

Course title (max. 100 characters including spaces):

Current title: Indigenous Health and Social Justice
Revised title: Indigenous Wellbeing, Health, and Social Justice

Course short title (max. 30 characters including spaces):

Current short title: Indigenous Health Justice
Revised short title: Indigenous Wellbeing

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous health with a focus on social justice. Students will learn about health inequities that face First Nations, Métis, and Inuit Peoples in rural and urban contexts within Canada as well as Indigenous Peoples internationally who have been impacted by processes of colonization. The course will critically examine how health status indicators are measured and used as well as link determinants of Indigenous Peoples' health to historical and ongoing colonial priorities and practices. Some of the disparities in health and social issues, access to care, and systemic challenges including racism experienced by Indigenous Peoples in different regions and contexts will be shared as points for discussion. An intersectionality lens will be applied in consideration of the unique health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit people. Innovative approaches to healing and community-based ethical practices will also be profiled in social work and health care delivery, research, policy, and programming. The perspectives of Indigenous Peoples will be highlighted in this course, through a variety of readings, film and other arts-based narratives, including Indigenous scholars and community activists in the delivery and discussion of course materials.

Revised description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous wellbeing and health through a social justice lens. The course critically links determinants of Indigenous Peoples' wellbeing and health to historical and ongoing colonial priorities and practices. Disparities in health and social issues, access to care, and systemic challenges, including racism experienced by Indigenous Peoples in different regions and contexts, are shared as points for discussion and reflection. An intersectionality lens is applied in consideration of the unique wellbeing and health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit Peoples. Indigenous approaches to science, healing, and community-based ethical practices are also profiled in social work and health care delivery, research, policy, and programming. The knowledges, values, and perspectives of Indigenous Peoples are highlighted throughout this course, incorporated within a variety of resources including readings, film and other arts-based narratives that include Indigenous scholars and community activists, in the delivery of course content and assignments. This course was created in consultation with a local Indigenous Advisory Circle that included community-based Indigenous Elders, health leaders, social workers, and academics involved in Indigenous initiatives and research. (Note: This is an online course).

Meet type(s): Lecture Online

Primary meet type: Lecture

Delivery mode: Only offered online

Requisites: None

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☒ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status: SWK 654R

Sections combined/held with:

Rationale for request:

The proposed change to the title and description of HLTH 644/SWK 654R is to more accurately reflect the content and intentions of the course post development.

Form completed by: **Department/School approval date** (mm/dd/yy): 01/10/22

Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 01/05/22
Faculty approval date (mm/dd/yy): 01/19/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Health

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: ___

☐ Inactivate: ___

☐ Revise: from ___ to ___

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Changing the Course title and Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: SWK

Course number: 654R

Course ID: 016294

Course title (max. 100 characters including spaces):

Current title: Indigenous Health and Social Justice
Revised title: Indigenous Wellbeing, Health, and Social Justice

Course short title (max. 30 characters including spaces):

Current short title: Indigenous Health Justice
Revised short title: Indigenous Wellbeing

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous health with a focus on social justice. Students will learn about health inequities that face First Nations, Métis, and Inuit Peoples in rural and urban contexts within Canada as well as Indigenous Peoples internationally who have been impacted by processes of colonization. The course will critically examine how health status indicators are measured and used as well as link determinants of Indigenous Peoples' health to historical and ongoing colonial priorities and practices. Some of the disparities in health and social issues, access to care, and systemic challenges including racism experienced by Indigenous Peoples in different regions and contexts will be shared as points for discussion. An intersectionality lens will be applied in consideration of the unique health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit people. Innovative approaches to healing and community-based ethical practices will also be profiled in social work and health care delivery, research, policy, and programming. The perspectives of Indigenous Peoples will be highlighted in this course, through a variety of readings, film and other arts-based narratives, including Indigenous scholars and community activists in the delivery and discussion of course materials.

Revised description: This interdisciplinary course is intended to engage and advance knowledge and practice in Indigenous wellbeing and health through a social justice lens. The course critically links determinants of Indigenous Peoples' wellbeing and health to historical and ongoing colonial priorities and practices. Disparities in health and social issues, access to care, and systemic challenges, including racism experienced by Indigenous Peoples in different regions and contexts, are shared as points for discussion and reflection. An intersectionality lens is applied in consideration of the unique wellbeing and health experiences among Indigenous Peoples, including Indigenous women, youth, and Two Spirit Peoples. Indigenous approaches to science, healing, and community-based ethical practices are also profiled in social work and health care delivery, research, policy, and programming. The knowledges, values, and perspectives of Indigenous Peoples are highlighted throughout this course, incorporated within a variety of resources including readings, film and other arts-based narratives that include Indigenous scholars and community activists, in the delivery of course content and assignments. This course was created in consultation with a local Indigenous Advisory Circle that included community-based Indigenous Elders, health leaders, social workers, and academics involved in Indigenous initiatives and research. (Note: This is an online course).

Meet type(s): Lecture Online

Primary meet type: Lecture

Delivery mode: Only offered online

Requisites: None

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☒ No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status: HLTH 644

Sections combined/held with:

Rationale for request:

The proposed change to the title and description of HLTH 644/SWK 654R is to more accurately reflect the content and intentions of the course post development.

Form completed by: Andrea Daley
Department/School approval date (mm/dd/yy): 12/15/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 01/05/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Programs: 1) Doctor of Philosophy (PhD) in Kinesiology

2) Doctor of Philosophy (PhD) in Kinesiology - Aging, Health and Well-Being

3) Master of Science (MSc) in Kinesiology

Program contact name(s): Andrew Laing

Form completed by: Denise Hay

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Changing the PhD and MSc program names to align with our unit name which recently changed from the "Department of Kinesiology" to the "Department of Kinesiology and Health Sciences".

Is this a major modification **to the program?** Yes

Rationale for change(s):

- *Aligning our program names with our recent departmental name change from the Department of Kinesiology to the Department of Kinesiology and Health Sciences.*
- *These program name changes will be more inclusive/reflective of the areas of research being undertaken by some current graduate students.*
- *The proposed change would align with the breadth of research conducted by KHS faculty members, which could assist with recruitment of future/prospective graduate students.*

Proposed effective date: Term: Fall Year: 2022

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-postdoctoral-affairs/future-students/programs/kinesiology-phd-waterloo

https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/future-students/programs/kinesiology-phd-aging-health-and-well-being-waterloo

https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/future-students/programs/kinesiology-msc-waterloo

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
Doctor of Philosophy (PhD) in Kinesiology **Doctor of Philosophy (PhD) in Kinesiology - Aging, Health and Well-Being** **Master of Science (MSc) in Kinesiology**	**Doctor of Philosophy (PhD) in Kinesiology and Health Sciences** **Doctor of Philosophy (PhD) in Kinesiology and Health Sciences - Aging, Health and Well-Being** **Master of Science (MSc) in Kinesiology and Health Sciences**

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

All currently registered thesis-based MSc and PhD students will have the option of graduating with either the original or revised program name. Details of the program name change will be communicated to them by the Associate Chair, Graduate Programs, via email. By default, students will retain the original program name. Students who wish to change to the revised program name will need indicate this to the Associate Chair, Graduate Programs.

Department/School approval date (02/16/2022):
Reviewed by GSPA (for GSPA use only) ☒ date: 03/17/22
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 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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Program: Doctor of Philosophy (PhD) in Kinesiology

Program contact name(s): Andrew Laing

Form completed by: Andrew Laing

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).

Articulating the criteria for students to obtain a graduate research field designation on their transcript.

Is this a major modification to the program? No

Rationale for change(s):

The Department of Kinesiology and Health Sciences would like students to have the opportunity to obtain a recognized "Graduate Research Field" when they graduate. This recognition will enhance the marketability of graduates by signifying to employers and other graduate schools that Kinesiology students have a particular research area of expertise beyond the broad knowledge expectations of their degrees.

In graduate programs, graduate research fields refer to a research area of concentration that is related to the collective strengths of the program's faculty. Kinesiology has identified a particular need to further specify and recognize existing areas of strength within its graduate programs. When students are considering their applications to MSc and PhD programs in Kinesiology, they specify a research field and supervisor based on their degree path. Their degree should also recognize this graduate research field on student transcripts. Student feedback has been very positive for this to happen for some time.

Proposed effective date: Term: ~~Spring~~ Fall Year: 2022

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/department-kinesiology/doctor-philosophy-phd-kinesiology

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Graduate research fields • Biomechanics • Neuroscience • Physiology and Nutrition **Degree requirements** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Since students' backgrounds are expected to differ considerably, course requirements will vary. However, a minimum of 3.00 units of graduate courses (e.g., 6 courses each at a 0.50 unit weight) beyond an Honours Bachelor degree is required. Of these, at least 0.50 units must be related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics. The course requirements will be determined in consultation with the candidate's supervisor and Advisory Committee. All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below 70% on any individual course or an average below 75% on the set of courses for the degree will result in a review of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course below 60%, the Department Graduate Committee review may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be	**Graduate research fields** • Biomechanics • Neuroscience • Physiology and Nutrition **Degree requirements** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Since students' backgrounds are expected to differ considerably, course requirements will vary. However, a minimum of 3.00 units of graduate courses (e.g., 6 courses each at a 0.50 unit weight) beyond an Honours Bachelor degree is required. Of these, at least 0.50 units must be related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics. o The course requirements will be determined in consultation with the candidate's supervisor and Advisory Committee. <u>Students pursuing one of the program's Graduate Research Fields, should inform their supervisor(s) of their chosen field to ensure appropriate course selection.</u> o All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below 70% on any individual course or an average below 75% on the set of courses for the degree will result in a review of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course below 60%, the Department Graduate Committee review

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. • **PhD Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **PhD Professional Development Seminar** o Students are required to complete a series of professional development seminars and workshops throughout their program of study. • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Applied Health Sciences Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements. Note: In the Faculty of Applied Health Sciences, the novel research topic is tested through a separate thesis proposal process. ▪ Timing: Consistent with University-level minimum requirements. ▪ Committee: Consistent with University-level minimum requirements with the exception that in	may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. • **PhD Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **PhD Professional Development Seminar** o Students are required to complete a series of professional development seminars and workshops throughout their program of study. • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Health Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements. Note: In the Faculty of Health, the novel research topic is tested through a separate thesis proposal process. ▪ Timing: Consistent with University-level minimum requirements.

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
the Faculty of Applied Health Sciences, the composition of the comprehensive examining committee will be approved by the Associate Chair or Director, Graduate Studies for the student's Department/School, as delegated by the Associate Dean, Graduate Studies. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: Consistent with University-level minimum requirements. • **PhD Thesis** o Thesis Proposal: Following successful completion of the comprehensive exam, each student will be required to compete a PhD thesis proposal. The proposal involves a written document related to the student's thesis area. The thesis project and proposal are developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory Committee consisting of the supervisor (or co-supervisors), and two other members (one of which must be from the home Department). A chair to oversee the oral thesis proposal defense will be appointed by the Department. o Thesis Defence: Each student is required to submit a thesis embodying the results of original research carried out under the direction of an Advisory Committee headed by	▪ Committee: Consistent with University-level minimum requirements with the exception that in the Faculty of Health, the composition of the comprehensive examining committee will be approved by the Associate Chair or Director, Graduate Studies for the student's Department/School, as delegated by the Associate Dean, Graduate Studies. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: Consistent with University-level minimum requirements. • **PhD Thesis** o Thesis Proposal: Following successful completion of the comprehensive exam, each student will be required to compete a PhD thesis proposal. The proposal involves a written document related to the student's thesis area. The thesis project and proposal are developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory Committee consisting of the supervisor (or co-supervisors), and two other members (one of which must be from the home Department). A chair to oversee the oral thesis proposal defense will be appointed by the Department. o Thesis Defence: Each student is required to submit a thesis embodying the results of

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee (see thesis proposal above), an additional member that is external to the Department (referred to as the internal-external), and finally an additional member that is external to the University (referred to as the external examiner). • **Other requirements** o Student evaluation: A review of each student's progress by both the supervisor and Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.	original research carried out under the direction of an Advisory Committee headed by the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee (see thesis proposal above), an additional member that is external to the Department (referred to as the internal-external), and finally an additional member that is external to the University (referred to as the external examiner). o Students may also wish to pursue one of the following Graduate Research Fields: ▪ Biomechanics ▪ Neuroscience ▪ Physiology and Nutrition o A Graduate Research Field is a University credential that is recognized on the student's transcript and is intended to reflect that a student has successfully completed research concentrated in the area of the Graduate Research Field. For the Graduate Research Field in Biomechanics, KIN 713 is a required course. The Department of Kinesiology and Health Sciences (e.g., student's supervisor(s) and Examining Committee, the Associate Chair of Graduate Studies) must assess whether a student's completed research warrants the field designation at the time of degree completion. To obtain the Graduate Research Field, students must also complete the requirements associated with the PhD degree. Students will be limited to one Graduate Research Field designation for their PhD in Kinesiology degree. • **Other requirements**

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
	o Student evaluation: A review of each student's progress by both the supervisor and Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.

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

Currently registered students will be able to obtain one of the Graduate Research Field designations if they fulfill the applicable degree requirements.

Department/School approval date (01/19/2022):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 12/16/21
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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Program: Master of Science (MSc) in Kinesiology - Aeronautics

Program contact name(s): Andrew Laing

Form completed by: Andrew Laing

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Kinesiology and Health Sciences is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Science (MSc) in Kinesiology - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Kinesiology and Health Sciences (KHS) is joining the CAP because it offers novel learning experiences for students who wish to bridge the domains of KHS and Aeronautics research and application. The multidisciplinary approaches underlying the program will aid students in generating impactful, integrative ideas/solutions, and will enhance advancement opportunities for career and research perspectives.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/department-kinesiology-and-health-sciences

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
MASTER OF SCIENCE (MSC) IN KINESIOLOGY **Graduate research fields** • Biomechanics • Neuroscience • Physiology and Nutrition	**MASTER OF SCIENCE (MSC) IN KINESIOLOGY - AERONAUTICS** ~~**Graduate research fields**~~ • ~~Biomechanics~~ • ~~Neuroscience~~ • ~~Physiology and Nutrition~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
Program information • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Length of program** o Must be completed within 6 terms full time or 12 terms part time. o Students must have permission of the Department Graduate Committee to continue enrolment beyond term limits. o Students are expected to devote as much time as is necessary to complete their thesis within this timeline. o Students must be continuously enrolled at the University to the end of the term in which they complete the degree requirements. • **Program type** o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o An Honours Bachelor’s degree (or equivalent) with at least a 75% average. o Letter indicating why the student wishes to pursue graduate studies. • **Application materials** o Curriculum vitae o Supplementary information form	**Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Length of program** o Must be completed within 6 terms full time or 12 terms part time. o Students must have permission of the Department Graduate Committee to continue enrolment beyond term limits. o Students are expected to devote as much time as is necessary to complete their thesis within this timeline. o Students must be continuously enrolled at the University to the end of the term in which they complete the degree requirements. • **Program type** o <u>Collaborative</u> o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o An Honours Bachelor’s degree (or equivalent) with at least a 75% average. o Letter indicating why the student wishes to pursue graduate studies. • **Application materials** o Curriculum vitae

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
o Transcript(s) o Writing sample ▪ Submit one copy of a term paper, research project or senior essay written during the last two years of undergraduate studies. • **References** o Number of references: 2 o Type of references: from faculty members who taught the student as an undergraduate. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete a minimum of 2.00 units of graduate courses (e.g., 4 courses each at 0.50 unit weight), including KIN 630 Research Design and Statistical Analysis (0.50 unit weight) or an equivalent course (related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics), with the approval of the Department Graduate Officer. All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below 70% on any individual course or an average below 75% on the set of courses for the degree will result in a review of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course	o Supplementary information form o Transcript(s) o Writing sample ▪ Submit one copy of a term paper, research project or senior essay written during the last two years of undergraduate studies. • **References** o Number of references: 2 o Type of references: from faculty members who taught the student as an undergraduate. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Students must successfully complete a minimum of 2.50 units of graduate courses (e.g., 5 courses each at 0.50 unit weight), including AVIA 601 Interdisciplinary Aeronautics, AVIA 602 Interdisciplinary Aeronautics Project, and KIN 630 Research Design and Statistical Analysis (0.50 unit weight) or an equivalent course (related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics), with the approval of the Department Graduate Officer. All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below 70% on any individual course or an average below 75% on the set of courses for the degree will result in a review

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
below 60%, the Department Graduate Committee review may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. o Students in the MSc in Kinesiology program may also wish to pursue one of the following Graduate Research Fields: 1. Biomechanics 2. Neuroscience 3. Physiology and Nutrition o A Graduate Research Field is a University credential that is recognized on the student's transcript and is intended to reflect that a student has successfully completed research and a set of courses that together provide an in-depth study in the area of the Graduate Research Field. A student will only obtain the Graduate Research Field on their transcript if they have completed the requirements associated with the MSc degree and the requirements associated with the Graduate Research Field. Students will be limited to one Graduate Research Field designation for their MSc in Kinesiology degree. o All MSc Graduate Research Fields in Kinesiology consist of a Master's Seminar, a Master's Thesis that is confirmed by the Department of Kinesiology and Health Sciences to be in the chosen Graduate Research Field, and a minimum of 2.0 units of graduate courses. This set of courses is comprised of a	of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course below 60%, the Department Graduate Committee review may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. o <u>This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602).</u> o ~~Students in the MSc in Kinesiology program may also wish to pursue one of the following Graduate Research Fields:~~ ~~1. Biomechanics~~ ~~2. Neuroscience~~ ~~3. Physiology and Nutrition~~ o ~~A Graduate Research Field is a University credential that is recognized on the student's transcript and is intended to reflect that a student has successfully completed research and a set of courses that together provide an in-depth study in the area of the~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
mix of required or elective courses. Required courses are those that are prescribed as part of the Graduate Research Field. Elective courses are those that are on a list of courses designated as electives for a given Graduate Research Field. o For any of the Graduate Research Fields below, an equivalent course focused on the Graduate Research Field may replace a required or elective course, with the approval of the Department Graduate Officer. o The course requirements for each of the Graduate Research Fields are described below. 1. Graduate Research Field in Biomechanics o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Biomechanics Graduate Research Field designation will be completed by the Department of Kinesiology and Health Sciences. ▪ Required courses: ▪ KIN 612 Instrumentation and Signal Processing in Biophysical Research ▪ KIN 613 Modern Methods in Biomechanical Modeling, Kinematics and Kinetics ▪ KIN 630 Research Design and Statistical Analysis ▪ Elective courses:	~~Graduate Research Field. A student will only obtain the Graduate Research Field on their transcript if they have completed the requirements associated with the MSc degree and the requirements associated with the Graduate Research Field. Students will be limited to one Graduate Research Field designation for their MSc in Kinesiology degree.~~ ~~o All MSc Graduate Research Fields in Kinesiology consist of a Master's Seminar, a Master's Thesis that is confirmed by the Department of Kinesiology and Health Sciences to be in the chosen Graduate Research Field, and a minimum of 2.0 units of graduate courses. This set of courses is comprised of a mix of required or elective courses. Required courses are those that are prescribed as part of the Graduate Research Field. Elective courses are those that are on a list of courses designated as electives for a given Graduate Research Field.~~ ~~o For any of the Graduate Research Fields below, an equivalent course focused on the Graduate Research Field may replace a required or elective course, with the approval of the Department Graduate Officer.~~ ~~o The course requirements for each of the Graduate Research Fields are described below.~~ ~~1. Graduate Research Field in Biomechanics~~ ~~o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Biomechanics Graduate Research Field designation will~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content:
▪ Open elective(s) (amounting to 0.50 unit weights) 2. Graduate Research Field in Neuroscience o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Neuroscience Graduate Research Field designation will be completed by the Department of Kinesiology and Health Sciences. ▪ Required course: ▪ KIN 630 Research Design and Statistical Analysis ▪ Elective courses: select elective courses amounting to 1.50 unit weights from the following list: ▪ KIN 616 Neural Control of Human Movement ▪ KIN 652 Movement Control and Learning ▪ KIN 653 Human Neuroscience Theory ▪ KIN 654 Instrumentation in Neuroscience Research ▪ KIN 657 Human Neuroanatomy ▪ KIN 686 Selected Topics in Neuroscience I (MSc) ▪ Open elective(s) (amounting to	~~be completed by the Department of Kinesiology and Health Sciences.~~ ~~▪ Required courses:~~ ~~▪ KIN 612 Instrumentation and Signal Processing in Biophysical Research~~ ~~▪ KIN 613 Modern Methods in Biomechanical Modeling, Kinematics and Kinetics~~ ~~▪ KIN 630 Research Design and Statistical Analysis~~ ~~▪ Elective courses:~~ ~~▪ Open elective(s) (amounting to 0.50 unit weights)~~ ~~2. Graduate Research Field in Neuroscience~~ ~~o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Neuroscience Graduate Research Field designation will be completed by the Department of Kinesiology and Health Sciences.~~ ~~▪ Required course:~~ ~~▪ KIN 630 Research Design and Statistical Analysis~~ ~~▪ Elective courses: select elective courses amounting to 1.50 unit weights from the following list:~~ ~~▪ KIN 616 Neural Control of Human Movement~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
0.50 unit weights) 3. Graduate Research Field in Physiology and Nutrition o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Physiology and Nutrition Graduate Research Field designation will be completed by the Department of Kinesiology and Health Sciences. ▪ Required course: ▪ KIN 630 Research Design and Statistical Analysis ▪ Elective courses: select elective courses amounting to 1.50 unit weights from the following list: ▪ KIN 601 Skeletal Muscle Physiology: Structure & Function ▪ KIN 602 Respiratory and Cardiovascular Physiology ▪ KIN 603 Cardiac and Vascular Smooth Muscle Physiology ▪ KIN 606 Molecular Basis of Disease ▪ KIN 607 Integrative Energy Metabolism in Health and Disease ▪ KIN 608 Introduction to Genetics for the Biosciences	~~▪ KIN 652 Movement Control and Learning~~ ~~▪ KIN 653 Human Neuroscience Theory~~ ~~▪ KIN 654 Instrumentation in Neuroscience Research~~ ~~▪ KIN 657 Human Neuroanatomy~~ ~~▪ KIN 686 Selected Topics in Neuroscience I (MSc)~~ ~~▪ Open elective(s) (amounting to 0.50 unit weights)~~ ~~3. Graduate Research Field in Physiology and Nutrition~~ ~~o Students must successfully complete the required and elective courses listed below. An assessment of whether or not the student's thesis warrants the Physiology and Nutrition Graduate Research Field designation will be completed by the Department of Kinesiology and Health Sciences.~~ ~~▪ Required course:~~ ~~▪ KIN 630 Research Design and Statistical Analysis~~ ~~▪ Elective courses: select elective courses amounting to 1.50 unit weights from the following list:~~ ~~▪ KIN 601 Skeletal Muscle Physiology: Structure & Function~~ ~~▪ KIN 602 Respiratory and~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content:
▪ KIN 609 Introduction to Genetics for Biosciences Lab ▪ KIN 632 Clinical Epidemiology and Health Measurement ▪ KIN 646 Physiological and Biochemical Aspects of Nutrition and Health ▪ KIN 680 Selected Topics in Physiology and Nutrition (MSc) ▪ KIN 691 Theory and Practice of Cardiorespiratory Assessment ▪ KIN 692 Interpretation of Cardiorespiratory Assessment and Exercise Prescription ▪ KIN 702 Cardiorespiratory Integration ▪ KIN 704 Bioactive Lipids ▪ Open elective(s) (amounting to 0.50 unit weights) • **Master's Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **Master's Thesis** o Thesis Proposal: Following successful completion of coursework, each student will be required to compete a Master's thesis proposal. The proposal involves a written document related to the	~~Cardiovascular Physiology~~ ▪ ~~KIN 603 Cardiac and Vascular Smooth Muscle Physiology~~ ▪ ~~KIN 606 Molecular Basis of Disease~~ ▪ ~~KIN 607 Integrative Energy Metabolism in Health and Disease~~ ▪ ~~KIN 608 Introduction to Genetics for the Biosciences~~ ▪ ~~KIN 609 Introduction to Genetics for Biosciences Lab~~ ▪ ~~KIN 632 Clinical Epidemiology and Health Measurement~~ ▪ ~~KIN 646 Physiological and Biochemical Aspects of Nutrition and Health~~ ▪ ~~KIN 680 Selected Topics in Physiology and Nutrition (MSc)~~ ▪ ~~KIN 691 Theory and Practice of Cardiorespiratory Assessment~~ ▪ ~~KIN 692 Interpretation of Cardiorespiratory Assessment and Exercise Prescription~~ ▪ ~~KIN 702 Cardiorespiratory Integration~~ ▪ ~~KIN 704 Bioactive Lipids~~

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content:
student's thesis area. The thesis project and proposal is developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory Committee, consisting of the supervisor (or co-supervisors), and two other members (one of which must be from the home Department). o Thesis Defence: Each student is required to submit a written thesis embodying the results of original research carried out under the direction of an Advisory Committee headed by the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee, which is normally the same Advisory Committee as the thesis proposal. • **Other requirements** o Student evaluation: A review of each student's progress by both the supervisor and the Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.	▪ ~~Open elective(s) (amounting to 0.50 unit weights)~~ • **Master's Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **Master's Thesis** o Thesis Proposal: Following successful completion of coursework, each student will be required to compete a Master's thesis proposal. The proposal involves a written document related to the student's thesis area. The thesis project and proposal must be applicable to Kinesiology and Aeronautics and is developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory Committee, consisting of the supervisor (or co-supervisors), and two other members (one of which must be from the home Department). o Thesis Defence: Each student is required to submit a written thesis embodying the results of original research carried out under the direction of an Advisory Committee headed by the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee, which is normally the same Advisory Committee as the thesis proposal. • **Other requirements** o Student evaluation: A review of each student's progress by both the supervisor and the

Current MSc in Kinesiology Graduate Studies Academic Calendar content:	**Proposed MSc in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
	Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.

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

Students currently enrolled in the MSc in Kinesiology program will have the opportunity to change to the CAP program once it comes into effect.

Department/School approval date (01/19/2022):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 12/15/21
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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Program: Doctor of Philosophy (PhD) in Kinesiology - Aeronautics

Program contact name(s): Andrew Laing

Form completed by: Andrew Laing

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Kinesiology and Health Sciences is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Doctor of Philosophy (PhD) *in Kinesiology - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.*

Rationale for change(s):

The Department of Kinesiology and Health Sciences (KHS) is joining the CAP because it offers novel learning experiences for students who wish to bridge the domains of KHS and Aeronautics research and application. The multidisciplinary approaches underlying the program will aid students in generating impactful, integrative ideas/solutions, and will enhance advancement opportunities for career and research perspectives.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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/department-kinesiology-and-health-sciences

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
DOCTOR OF PHILOSOPHY (PHD) IN KINESIOLOGY **Graduate research fields** • Biomechanics • Neuroscience • Physiology and Nutrition	**DOCTOR OF PHILOSOPHY (PHD) IN KINESIOLOGY - AERONAUTICS** ~~**Graduate research fields**~~ • ~~Biomechanics~~ • ~~Neuroscience~~ • ~~Physiology and Nutrition~~

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
Program information • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Length of program** o Must be completed within 12 terms (full time) from completion of the Master's degree. o Students must have permission of the Department Graduate Committee to continue enrolment beyond term limits. o Students are expected to devote as much time as is necessary to complete their thesis within this timeline. o Students must be continuously enrolled at the University to the end of the term in which they complete the degree requirements. • **Program type** o Doctoral o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o A Master's degree with a minimum 75% average in a relevant field (normally Kinesiology or a discipline related to their area of concentration). o Letter stating research interests and why the student wishes to pursue graduate studies.	**Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Length of program** o Must be completed within 12 terms (full time) from completion of the Master's degree. o Students must have permission of the Department Graduate Committee to continue enrolment beyond term limits. o Students are expected to devote as much time as is necessary to complete their thesis within this timeline. o Students must be continuously enrolled at the University to the end of the term in which they complete the degree requirements. • **Program type** o <u>Collaborative</u> o Doctoral o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o A Master's degree with a minimum 75% average in a relevant field (normally Kinesiology or a discipline related to their area of concentration). o Letter stating research interests and why the student wishes to

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
• **Application materials** o Curriculum vitae o Supplementary information form o Transcript(s) o Writing sample ▪ Submit one copy of a term paper, research project, or thesis written during the students last year of Master's studies. • **References** o Number of references: 3 o Type of references: from faculty members who taught the student while in a Master's program. Normally, 1 must be from the Master's supervisor. • **English language proficiency (ELP)** (if applicable) **Degree requirements** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Since students' backgrounds are expected to differ considerably, course requirements will vary. However, a minimum of 3.00 units of graduate courses (e.g., 6 courses each at a 0.50 unit weight) beyond an Honours Bachelor degree is required. Of these, at least 0.50 units must be related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics. The course requirements will be determined in consultation with the candidate's supervisor and Advisory Committee. All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below	pursue graduate studies. • **Application materials** o Curriculum vitae o Supplementary information form o Transcript(s) o Writing sample ▪ Submit one copy of a term paper, research project, or thesis written during the students last year of Master's studies. • **References** o Number of references: 3 o Type of references: from faculty members who taught the student while in a Master's program. Normally, 1 must be from the Master's supervisor. • **English language proficiency (ELP)** (if applicable) **Degree requirements** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** o Since students' backgrounds are expected to differ considerably, course requirements will vary. However, a minimum of 3.00 units of graduate courses (e.g., 6 courses each at a 0.50 unit weight) beyond an Honours Bachelor degree is required. Of these, at least 0.50 units must be related to quantitative or qualitative analysis, such as research methods, modelling, mathematics, or statistics. o <u>Students must successfully complete the following courses:</u> ▪ <u>AVIA 601 Interdisciplinary Aeronautics</u> ▪ <u>AVIA 802 Interdisciplinary Aeronautics Project - PhD Level</u>

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
70% on any individual course or an average below 75% on the set of courses for the degree will result in a review of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course below 60%, the Department Graduate Committee review may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. • **PhD Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **PhD Professional Development Seminar** o Students are required to complete a series of professional development seminars and workshops throughout their program of study. • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Health Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with	▪ 1 KIN graduate level elective o o Students who have already completed AVIA 601 and AVIA 602 as part of their Masters Aeronautics degree, must complete the following course requirements: ▪ AVIA 802 Interdisciplinary Aeronautics Project - PhD Level or 1 elective graduate course that is applicable to aeronautics (approved by their supervisor with support from the Director of the CAP program) o 1 KIN graduate level elective o The course requirements will be determined in consultation with the candidate's supervisor and Advisory Committee. All graduate courses must be assigned a numerical grade. Students must obtain an average of at least 75% in the set of courses which they present in fulfilment of course requirements. A grade below 70% on any individual course or an average below 75% on the set of courses for the degree will result in a review of the student's status by the Department Graduate Committee. If a student receives a grade in any individual course below 60%, the Department Graduate Committee review may result in the requirement to withdraw from the program. If the student is permitted to proceed, any course with a grade below 60% will not be eligible towards the degree requirements, thus requiring the course to be repeated or additional course work to be completed. o This degree is offered through the Collaborative Aeronautics

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
University-level minimum requirements. Note: In the Faculty of Health, the novel research topic is tested through a separate thesis proposal process. ▪ Timing: Consistent with University-level minimum requirements. ▪ Committee: Consistent with University-level minimum requirements with the exception that in the Faculty of Health, the composition of the comprehensive examining committee will be approved by the Associate Chair or Director, Graduate Studies for the student's Department/School, as delegated by the Associate Dean, Graduate Studies. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: Consistent with University-level minimum requirements. • **PhD Thesis** o Thesis Proposal: Following successful completion of the comprehensive exam, each student will be required to compete a PhD thesis proposal. The proposal involves a written document related to the student's thesis area. The thesis project and proposal are developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory	Program. This program, jointly offered by a range of departments/schools across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments/schools, while working with colleagues from a variety of other departments/schools in core interdisciplinary courses (AVIA 601 and AVIA 602/802). • **PhD Seminar** o Students are required to complete a series of academic and discipline-specific seminars throughout their program of study. • **PhD Professional Development Seminar** o Students are required to complete a series of professional development seminars and workshops throughout their program of study. • **PhD Comprehensive Examination** o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Health Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements. Note: In the Faculty of Health, the novel

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	**Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content**:
Committee consisting of the supervisor (or co-supervisors), and two other members (one of which must be from the home Department). A chair to oversee the oral thesis proposal defense will be appointed by the Department. o Thesis Defence: Each student is required to submit a thesis embodying the results of original research carried out under the direction of an Advisory Committee headed by the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee (see thesis proposal above), an additional member that is external to the Department (referred to as the internal-external), and finally an additional member that is external to the University (referred to as the external examiner). • **Other requirements** o Student evaluation: A review of each student's progress by both the supervisor and Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.	research topic is tested through a separate thesis proposal process. ▪ Timing: Consistent with University-level minimum requirements. ▪ Committee: Consistent with University-level minimum requirements with the exception that in the Faculty of Health, the composition of the comprehensive examining committee will be approved by the Associate Chair or Director, Graduate Studies for the student's Department/School, as delegated by the Associate Dean, Graduate Studies. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: Consistent with University-level minimum requirements. • **PhD Thesis** o Thesis Proposal: Following successful completion of the comprehensive exam, each student will be required to compete a PhD thesis proposal. The proposal involves a written document related to the student's thesis area. The thesis project and proposal must be applicable to Kinesiology and Aeronautics and are developed in consultation with the supervisor. Each student must orally defend the thesis proposal to the Advisory Committee consisting of the supervisor (or co-supervisors),

Current PhD in Kinesiology Graduate Studies Academic Calendar content:	Proposed PhD in Kinesiology - Aeronautics Graduate Studies Academic Calendar content:
	and two other members (one of which must be from the home Department). A chair to oversee the oral thesis proposal defense will be appointed by the Department. o Thesis Defence: Each student is required to submit a thesis embodying the results of original research carried out under the direction of an Advisory Committee headed by the supervisor. The candidate defends the thesis before an Examining Committee approved by the Department Graduate Committee. The Examining Board should consist of the Advisory Committee (see thesis proposal above), an additional member that is external to the Department (referred to as the internal-external), and finally an additional member that is external to the University (referred to as the external examiner). • **Other requirements** o Student evaluation: A review of each student's progress by both the supervisor and Department Graduate Committee takes place each year. Students are evaluated on several criteria, including performance in courses, progress towards course and milestone completion, thesis progress, scholarly activity, and research and teaching assistantship activity.

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

Students currently enrolled in the PhD in Kinesiology program will have the opportunity to change to the CAP program once it comes into effect.

Department/School approval date (01/19/2022):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 12/15/21
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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Program: Master of Public Health (MPH)

Program contact name(s): Mark Oremus

Form completed by: Mark Oremus

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Removing the environmental health sciences concentration option from the courses section of the Graduate Studies Academic Calendar.

Is this a major modification to the program? No

Rationale for change(s):

The environmental health sciences concentration in the Master of Public Health program requires students to take two courses that are not currently offered: HLTH 624 Environmental Toxicology in Public Health and HLTH 634 Environmental Epidemiology for Public Health. While HLTH 634 is expected to return shortly, we do not have a timeline for the return of HLTH 624. Therefore, this concentration cannot currently be offered to students and we do not have an estimate of whether it will be possible to offer this concentration in the future.

Proposed motion: to remove the environmental health sciences concentration from the GSAC.

Proposed effective date: Term: ~~Spring~~ Fall Year: 2022

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-sciences/master-public-health-mph

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Degree requirements • **Courses** o The minimum course requirements are 11 one-term (0.50 unit weight) graduate courses, 2 block courses requiring two-weeks on campus (0.50 unit weight) and a practicum (1.50 unit weight).	**Degree requirements** • **Courses** o The minimum course requirements are 11 one-term (0.50 unit weight) graduate courses, 2 block courses requiring two-weeks on campus (0.50 unit weight) and a practicum (1.50 unit weight).

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
o Students will attend on-campus on two occasions for 2-week block courses. The first, HLTH 602A Foundations of Public Health, will occur at the start of the program and the second, HLTH 602B Capstone Integrative Seminar for Public Health, will bring students back together at the end of the program after completion of all coursework and the practicum: ▪ The objective of HLTH 602A, the Foundations of Public Health course is to provide students with foundational knowledge of public health, orient the student to the philosophical and practical bases of public health, and to kindle the student's passion for public health as a career and as a societal activity. ▪ HTLH 602B, the final MPH capstone course, is a culminating integrated learning experience that provides a context for students to demonstrate their achievement of the foundational knowledge and core competencies of public health. On-campus workshops and preparation and presentation of a capstone project are required for the completion of this course. o Additional required courses are as follows: ▪ HLTH 603 Health Policy in Public Health ▪ HLTH 604 Public Health and the Environment ▪ One of: HLTH 605A Regression Models OR HLTH 605B Quantitative Methods and Analysis ▪ One of: HLTH 606A Epidemiological Methods OR HLTH 606B Principles of Epidemiology for Public Health ▪ HLTH 607 Social, Cultural and Behavioural Aspects of Public Health I ▪ HLTH 608 Health and Risk Communication in Public Health	o Students will attend on-campus on two occasions for 2-week block courses. The first, HLTH 602A Foundations of Public Health, will occur at the start of the program and the second, HLTH 602B Capstone Integrative Seminar for Public Health, will bring students back together at the end of the program after completion of all coursework and the practicum: ▪ The objective of HLTH 602A, the Foundations of Public Health course is to provide students with foundational knowledge of public health, orient the student to the philosophical and practical bases of public health, and to kindle the student's passion for public health as a career and as a societal activity. ▪ HTLH 602B, the final MPH capstone course, is a culminating integrated learning experience that provides a context for students to demonstrate their achievement of the foundational knowledge and core competencies of public health. On-campus workshops and preparation and presentation of a capstone project are required for the completion of this course. o Additional required courses are as follows: ▪ HLTH 603 Health Policy in Public Health ▪ HLTH 604 Public Health and the Environment ▪ One of: HLTH 605A Regression Models OR HLTH 605B Quantitative Methods and Analysis ▪ One of: HLTH 606A Epidemiological Methods OR HLTH 606B Principles of Epidemiology for Public Health ▪ HLTH 607 Social, Cultural and Behavioural Aspects of Public Health I ▪ HLTH 608 Health and Risk Communication in Public Health

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
▪ HLTH 609 Management and Administration of Public Health Services ▪ HLTH 617 Population Intervention for Disease Prevention and Health Promotion ▪ HLTH 618 Research Tools for Public Health Practice ▪ HLTH 640 Professional Experience Practicum o At a minimum, students must obtain an average of 75% or higher in aggregate on the courses presented in fulfilment of the degree requirements. Grades on all courses presented to fulfill the degree 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 of Public Health Sciences (SPHS) and may result in a student being required to complete additional coursework or being required to withdraw from the program. The School reserves the right to stipulate additional coursework if it is necessary for the student's preparation. o ~~To graduate from the environmental health sciences concentration, a student is required to complete the required core courses plus HLTH 624 Environmental Toxicology in Public Health and HLTH 634 Environmental Epidemiology for Public Health.~~ o ~~MPH general degree students will be required to complete the required core courses as well as 2 elective HLTH courses. Graduate courses from other departments may be acceptable if approved by the SPHS Professional Graduate Programs Committee.~~ o Students admitted for a probationary year will be required to complete HLTH 605A Regression Models (on-campus only) or 605B Quantitative Methods and Analysis (online, fall term) and HLTH 606A Epidemiological Methods (on-campus only) or HLTH 606B Principles of Epidemiology for Public Health (online, winter term) with an average of at least 73%. If a student's average on these courses falls below 73% but not below 70%, their status will be reviewed by the SPHS Professional	▪ HLTH 609 Management and Administration of Public Health Services ▪ HLTH 617 Population Intervention for Disease Prevention and Health Promotion ▪ HLTH 618 Research Tools for Public Health Practice ▪ HLTH 640 Professional Experience Practicum ▪ <u>Two elective HLTH courses. Note: Graduate courses from other departments/schools may be acceptable if approved by the SPHS Professional Graduate Programs Committee</u> o At a minimum, students must obtain an average of 75% or higher in aggregate on the courses presented in fulfilment of the degree requirements. Grades on all courses presented to fulfill the degree 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 of Public Health Sciences (SPHS) and may result in a student being required to complete additional coursework or being required to withdraw from the program. The School reserves the right to stipulate additional coursework if it is necessary for the student's preparation. o Students admitted for a probationary year will be required to complete HLTH 605A Regression Models (on-campus only) or 605B Quantitative Methods and Analysis (online, fall term) and HLTH 606A Epidemiological Methods (on-campus only) or HLTH 606B Principles of Epidemiology for Public Health (online, winter term) with an average of at least 73%. If a student's average on these courses falls below 73% but not below 70%, their status will be reviewed by the SPHS Professional Graduate Programs Committee. Normally a student will not continue on probationary status for more than two terms.

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Graduate Programs Committee. Normally a student will not continue on probationary status for more than two terms.	

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

Currently, only one student is interested in pursuing the environmental health concentration and we provided her with alternatives to HLTH 624 and HLTH 634. No other students are interested in this concentration.

Department/School approval date (mm/dd/yy): 02/14/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 02/11/22
Faculty approval date (mm/dd/yy): 02/23/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Health

Programs: 1) Doctor of Philosophy (PhD) in Public Health and Health Systems

2) Doctor of Philosophy (PhD) in Public Health and Health Systems - Aging, Health and Well-Being

3) Doctor of Philosophy (PhD) in Public Health and Health Systems - Water

4) Master of Science (MSc) in Public Health and Health Systems

5) Master of Science (MSc) in Public Health and Health Systems - Water

Program contact name(s): Samantha Meyer

Form completed by: Samantha Meyer

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Changing the PhD and MSc program names to align with the name of the School which changed from the "School of Public Health and Health Systems" to the "School of Public Health Sciences" earlier in 2021.

Is this a major modification to the program? Yes

Rationale for change(s):

In September 2021 the School of Public Health and Health Systems changed their name to the School of Public Health Sciences. We are proposing to change the names of our Graduate Research Programs (the MSc and PhD) to align with the new name of the school.

Proposed effective date: Term: ~~Spring~~ Fall Year: 2022

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-sciences/doctor-philosophy-phd-public-health-and-health-systems

https://uwaterloo.ca/graduate-studies-academic-calendar/applied-health-sciences/school-public-health-sciences/doctor-philosophy-phd-public-health-and-health-systems-aging-health-and-well-being

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

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

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

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
Doctor of Philosophy (PhD) in Public Health ~~and Health Systems~~	**Doctor of Philosophy (PhD) in Public Health Sciences**
Doctor of Philosophy (PhD) in Public Health ~~and Health Systems~~ - Aging, Health and Well-Being	**Doctor of Philosophy (PhD) in Public Health Sciences - Aging, Health and Well-Being**
Doctor of Philosophy (PhD) in Public Health ~~and Health Systems~~ - Water	**Doctor of Philosophy (PhD) in Public Health Sciences - Water**
Master of Science (MSc) in Public Health ~~and Health Systems~~	**Master of Science (MSc) in Public Health Sciences**
Master of Science (MSc) in Public Health ~~and Health Systems~~ - Water	**Master of Science (MSc) in Public Health Sciences - Water**

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

Students currently enrolled in the MSc/PhD in Public Health and Health Systems will be awarded a degree that reflects the new degree name (Public Health Sciences). However, they will have the option of retaining the old degree name if they choose. They will be required to opt out of the new name and this will be communicated to them by the Associate Director, Graduate Programs, via email. Students who are applying for the fall 2022 intake will be advised of the degree name change in their offer of admission letter.

Department/School approval date (12/10/21):
Reviewed by GSPA (for GSPA use only) ☐ date (11/29/21):
Faculty approval date (01/19/22):
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. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Applied Health Sciences

Effective date: Term: Fall Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☐ Inactivate:

☐ Revise: from to

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: KIN

Course number: 659

Course ID:

Course title (max. 100 characters including spaces): Wearable Technology

Course short title (max. 30 characters including spaces): Wearable Technology

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Instructor

Course description: An examination of theory, technology and applications of wearable technology for health to be used in clinical, workplace or at home settings. The course will consider the opportunities

and potential challenges to use of current technology and the exploration of the approaches necessary to maximize the usability and health benefits of wearable health technology.

Meet type(s): Lecture Lab Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Form completed by: Bill McIlroy/Denise Hay
Department/School approval date (12/22/21):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Applied Health Sciences

Effective date: Term: Fall Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New:

☐ Inactivate:

☐ Revise: from to

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: KIN

Course number: 658

Course ID:

Course title (max. 100 characters including spaces): Physical Activity and Cognition

Course short title (max. 30 characters including spaces): Physical Activity and Cognition

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: This course provides a multi-disciplinary examination of the relationship between physical activity and cognition function. This will include discussion of the effects of physical activity and exercise on cognition functions, and how the effects are modified by age, exercise dose, and setting. We

explore growing interest in the use of exercise as a cognitive rehabilitation strategy. In addition, the effects of cognitive impairment on movement and physical activity participation will be discussed from various perspectives (neurophysiological, biomechanical, psychosocial, and legislative).

Meet type(s): Lecture Lecture Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

Form completed by: Laura Middleton/Denise Hay
Department/School approval date (12/22/21):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Mathematics Graduate Studies report

1. Calendar changes Master of Mathematics for Teachers
2. Calendar changes Computer Science
3. Calendar changes Applied Math

1. Calendar changes Master of Mathematics for Teachers

Motion to revise the course title and description for MATH 690

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Effective date: Term: ~~Spring~~ Fall Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Revising Course title, Course short title, and Course description. Removing Course consent required. Adding Requisites.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: MATH

Course number: 690

Course ID: 013834

Course title (max. 100 characters including spaces):

Current title: Summer Conference for Teachers of Mathematics
Revised title: Workshop for Teachers of Mathematics

Course short title (max. 30 characters including spaces):

Current short title: MMT Summer Conference
Revised short title: MMT Workshop

Grading basis: Credit/No Credit

Course credit weight: 0.25

Course credit weight: 0.25

Course consent required: Not required

Course description:

Current description: This intense 4-day workshop focuses on the integration of problem solving technology into the curriculum and enrichment activities. The Workshop is suitable for teachers from all over the world.

Revised description: This course provides the opportunity to connect and collaborate with other students, to synthesize key takeaways from other courses, and to bridge the gap between educational theory and practice. Course activities may include problem-solving, discussion, analysis of mathematics education research, presentations, and peer review. The course includes a limited number of synchronous meetings, and may include optional in-person participation in a CEMC conference for mathematics teachers.

Meet type(s): Seminar Choose an item. Choose an item. Choose an item.

Primary meet type: Seminar

Delivery mode: Only offered online

Requisites: Coreq: MATH 600, MATH 692

Special topics course: Yes ☐ No ☒

Cross-listed course: Yes ☐ No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This decouples the course from mandatory attendance at the CEMC in-person conference for math teachers. Doing this proved very successful when redesigned for a purely online format during the pandemic and allows for equitable access to the course for all MMT students. Increased detail in the description more explicitly cites the goals of the course and activities in support of these objectives.

Department Consent Required is being dropped because it was there to fairly enforce capacity constraints due to physical space limitations which no longer apply.

The addition of MATH 600 and MATH 692 as corequisites aligns MATH 690 requisites with most other MMT courses and is now needed with department consent no longer required.

Form completed by: J.P. Pretti
Department/School approval date (mm/dd/yy): 10/26/21
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 11/11/21
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

2. Calendar changes Computer Science

Motion to discontinue coursework option from:

- Master of Mathematics in Computer Science
- Master of Mathematics in Computer Science – Co-operative Program

Background information:

We matriculated 6 students out of 813 applications in F21 and 10 students out of 514 applications in F20. We matriculated as many as 30 students back in F18. Administratively, it is a significant drain on our resources to review 800 applications. Each coursework student must take 8 graduate courses instead of 4 courses for our research students. We would have needed 4 to 5 extra sections per term to support the coursework students if we had continued to matriculate the same number of students that we did in F18. New sections are necessary since most of our graduate courses are close to full capacity. We also don't want to force students to take courses that they have no interest in. We receive the same amount of funding support for a coursework student as we do for a research student even though they require twice the teaching resources. We cannot begin planning for a new graduate program until we discontinue the previous one.

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 and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Program: 1) Master of Mathematics (MMath) in Computer Science

2) Master of Mathematics (MMath) in Computer Science - Co-operative Program

Program contact name(s): Bernard Wong, Denise Shantz

Form completed by: Denise Shantz

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Discontinue the coursework study option from the MMath in Computer Science programs.

Is this a major modification to the program? Yes

Rationale for change(s):

We are requesting the discontinuation of our current MMath in Computer Science coursework study option. Due to student volume, we are having to create more sections of course offerings, therefore requiring more faculty members to teach. The coursework students consume a significant amount of our resources and financially, the current program is not sustainable. This program discontinuation would not affect any of our current students. We would offer to transfer current applications for the Fall 2022 term to the thesis or MRP study options or to another program in the Faculty of Mathematics.

Proposed effective date: Term: Fall Year: 2022

Note: the coursework study option will be discontinued and the School will no longer accept applications for the next application cycle.

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/david-r-cheriton-school-computer-science/master-mathematics-mmath-computer-science

https://uwaterloo.ca/graduate-studies-academic-calendar/mathematics/david-r-cheriton-school-computer-science/master-mathematics-mmath-computer-science-co-operative-program

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:

Current Graduate Studies Academic Calendar content:

Program information

- Admit term(s)
  - Fall
  - Winter
  - Spring
- Delivery mode
  - On-campus
- Program type
  - Master's
  - Research
- Registration option(s)
  - Full-time
  - Part-time
- Study option(s)
  - Thesis
  - Master's Research Paper
  - ~~Coursework~~

Degree requirements

Thesis option:

- Graduate Academic Integrity Module (Graduate AIM)
- Courses
  - Students must complete 4 one-term (0.50 unit weight) graduate courses:
    - At least 1 course must be at the 800 level
    - At most 1 course can be at the 600 level.
    - No more than 2 courses can be taken for degree credit in one area.
  - Normally, courses need to be selected from the Categories and Areas table but exceptions can be granted by the School of Computer Science.

Category	Area	Computer Science (CS) Courses
Computing Technology	Software Engineering	CS 645, CS 646, CS 647, CS 745, CS 746, CS 846
	Programming Languages	CS 642, CS 644, CS 744, CS 747, CS 842

Proposed Graduate Studies Academic Calendar content:

Program information

- Admit term(s)
  - Fall
  - Winter
  - Spring
- Delivery mode
  - On-campus
- Program type
  - Master's
  - Research
- Registration option(s)
  - Full-time
  - Part-time
- Study option(s)
  - Thesis
  - Master's Research Paper

Degree requirements

Thesis option:

- Graduate Academic Integrity Module (Graduate AIM)
- Courses
  - Students must complete 4 one-term (0.50 unit weight) graduate courses:
    - At least 1 course must be at the 800 level
    - At most 1 course can be at the 600 level.
    - No more than 2 courses can be taken for degree credit in one area.
  - Normally, courses need to be selected from the Categories and Areas table but exceptions can be granted by the School of Computer Science.

Category	Area	Computer Science (CS) Courses
Computing Technology	Software Engineering	CS 645, CS 646, CS 647, CS 745, CS 746, CS 846
	Programming Languages	CS 642, CS 644, CS 744, CS 747, CS 842

Current Graduate Studies Academic Calendar content:				**Proposed Graduate Studies Academic Calendar content**:			
		Hardware and Software Systems	CS 650, CS 651, CS 652, CS 654, CS 655, CS 656, CS 657, CS 658, CS 755, CS 758, CS 854, CS 856, CS 858**,CS 869			Hardware and Software Systems	CS 650, CS 651, CS 652, CS 654, CS 655, CS 656, CS 657, CS 658, CS 755, CS 758, CS 854, CS 856, CS 858**,CS 869
	Mathematics of Computing	Algorithms and Complexity	CS 662, CS 664, CS 666, CS 758, CS 761, CS 762, CS 763, CS 764, CS 765, CS 767, CS 840, CS 858**, CS 860		Mathematics of Computing	Algorithms and Complexity	CS 662, CS 664, CS 666, CS 758, CS 761, CS 762, CS 763, CS 764, CS 765, CS 767, CS 840, CS 858**, CS 860
		Scientific and Symbolic Computing	CS 670, CS 672, CS 675, CS 676, CS 679, CS 687, CS 770, CS 774, CS 775, CS 778, CS 779, CS 780, CS 870, CS 887			Scientific and Symbolic Computing	CS 670, CS 672, CS 675, CS 676, CS 679, CS 687, CS 770, CS 774, CS 775, CS 778, CS 779, CS 780, CS 870, CS 887
		Computational Statistics	CS 680, CS 685, CS 786, CS 885			Computational Statistics	CS 680, CS 685, CS 786, CS 885
		Quantum Information and Computation	CS 766, CS 768, CS 867			Quantum Information and Computation	CS 766, CS 768, CS 867
	Applications	Artificial Intelligence	CS 679, CS 684, CS 686, CS 784, CS 785, CS 787, CS 886		Applications	Artificial Intelligence	CS 679, CS 684, CS 686, CS 784, CS 785, CS 787, CS 886
		Databases	CS 640, CS 648, CS 740, CS 741, CS 742, CS 743, CS 848, CS 856*			Databases	CS 640, CS 648, CS 740, CS 741, CS 742, CS 743, CS 848, CS 856*
		Graphics and User Interfaces	CS 649, CS 688, CS 781, CS 783, CS			Graphics and User Interfaces	CS 649, CS 688, CS 781, CS 783, CS

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

		788, CS 789, CS 791, CS 888, CS 889
	Bioinformatics	CS 682, CS 782, CS 882
	Health Informatics	CS 792

- Note: * The versions of CS 856 entitled "Internet-Scale Distributed Data Management" and "Web Data Management" can be used as a Databases course.
- Note: ** CS 858 can be used as a Hardware and Software Systems course or as an Algorithms and Complexity course, depending on the course offering.

- Master's Thesis
  - Students must present their research topic in a publicly announced seminar.
- Other requirements
  - Fast-track admission to the PhD in Computer Science: the School of Computer Science offers excellent students an opportunity to transfer from the MMath program to the Doctor of Philosophy (PhD) program. This transfer enables the student to begin doctoral research, bypassing the MMath thesis. To apply for this transfer, a student submits a letter of application to the Associate Director of Graduate Studies, any time after the completion of the second term of registration in the MMath program or earlier in exceptional circumstances. The application must be strongly supported by the student's proposed PhD supervisor. A successful applicant would normally be in the thesis option and have an excellent academic record. Evidence must be available that the student has begun a viable research program. If accepted for transfer to the PhD program, the student is expected to meet the requirements for a PhD student entering directly from a Bachelor's degree.

		788, CS 789, CS 791, CS 888, CS 889
	Bioinformatics	CS 682, CS 782, CS 882
	Health Informatics	CS 792

- Note: * The versions of CS 856 entitled "Internet-Scale Distributed Data Management" and "Web Data Management" can be used as a Databases course.
- Note: ** CS 858 can be used as a Hardware and Software Systems course or as an Algorithms and Complexity course, depending on the course offering.

- Master's Thesis
  - Students must present their research topic in a publicly announced seminar.
- Other requirements
  - Fast-track admission to the PhD in Computer Science: the School of Computer Science offers excellent students an opportunity to transfer from the MMath program to the Doctor of Philosophy (PhD) program. This transfer enables the student to begin doctoral research, bypassing the MMath thesis. To apply for this transfer, a student submits a letter of application to the Associate Director of Graduate Studies, any time after the completion of the second term of registration in the MMath program or earlier in exceptional circumstances. The application must be strongly supported by the student's proposed PhD supervisor. A successful applicant would normally be in the thesis option and have an excellent academic record. Evidence must be available that the student has begun a viable research program. If accepted for transfer to the PhD program, the student is expected to meet the requirements for a PhD student entering directly from a Bachelor's degree.

Current Graduate Studies Academic Calendar content:

Master's Research Paper option:

Note: it is not possible to be admitted directly to the Master's Research Paper option but students may be able to transfer to it from the ~~other two~~ option~~s~~.

- Graduate Academic Integrity Module (Graduate AIM)
- Courses
  - Students must complete 7 one-term (0.50 unit weight) courses:
    - At least 2 of the courses must be at the 800 level.
    - At most 3 of the courses can be at the 600 level.
    - No more than 3 courses can be taken for degree credit in one area.
  - Normally, courses need to be selected from the Categories and Areas table but exceptions can be granted by the School of Computer Science.

Category	Area	Computer Science (CS) Courses
Computing Technology	Software Engineering	CS 645, CS 646, CS 647, CS 745, CS 746, CS 846
	Programming Languages	CS 642, CS 644, CS 744, CS 747, CS 842
	Hardware and Software Systems	CS 650, CS 651, CS 652, CS 654, CS 655, CS 656, CS 657, CS 658, CS 755, CS 758, CS 854, CS 856, CS 858**,CS 869
Mathematics of Computing	Algorithms and Complexity	CS 662, CS 664, CS 666, CS 758, CS 761, CS 762, CS 763, CS 764, CS 765,

Proposed Graduate Studies Academic Calendar content:

Master's Research Paper option:

Note: it is not possible to be admitted directly to the Master's Research Paper option but students may be able to transfer to it from the <u>thesis</u> option.

- Graduate Academic Integrity Module (Graduate AIM)
- Courses
  - Students must complete 7 one-term (0.50 unit weight) courses:
    - At least 2 of the courses must be at the 800 level.
    - At most 3 of the courses can be at the 600 level.
    - No more than 3 courses can be taken for degree credit in one area.
  - Normally, courses need to be selected from the Categories and Areas table but exceptions can be granted by the School of Computer Science.

Category	Area	Computer Science (CS) Courses
Computing Technology	Software Engineering	CS 645, CS 646, CS 647, CS 745, CS 746, CS 846
	Programming Languages	CS 642, CS 644, CS 744, CS 747, CS 842
	Hardware and Software Systems	CS 650, CS 651, CS 652, CS 654, CS 655, CS 656, CS 657, CS 658, CS 755, CS 758, CS 854, CS 856, CS 858**,CS 869
Mathematics of Computing	Algorithms and Complexity	CS 662, CS 664, CS 666, CS 758, CS 761, CS 762, CS 763, CS 764, CS 765,

Current Graduate Studies Academic Calendar content:			
			CS 767, CS 840, CS 858**, CS 860
		Scientific and Symbolic Computing	CS 670, CS 672, CS 675, CS 676, CS 679, CS 687, CS 770, CS 774, CS 775, CS 778, CS 779, CS 780, CS 870, CS 887
		Computational Statistics	CS 680, CS 685, CS 786, CS 885
		Quantum Information and Computation	CS 766, CS 768, CS 867
	Applications	Artificial Intelligence	CS 679, CS 684, CS 686, CS 784, CS 785, CS 787, CS 886
		Databases	CS 640, CS 648, CS 740, CS 741, CS 742, CS 743, CS 848, CS 856*
		Graphics and User Interfaces	CS 649, CS 688, CS 781, CS 783, CS 788, CS 789, CS 791, CS 888, CS 889
		Bioinformatics	CS 682, CS 782, CS 882
		Health Informatics	CS 792

- Note: * The versions of CS 856 entitled "Internet-Scale Distributed Data Management" and "Web Data Management" can be used as a Databases course.
- Note: ** CS 858 can be used as a Hardware and Software Systems course or as an Algorithms and

Proposed Graduate Studies Academic Calendar content:			
			CS 767, CS 840, CS 858**, CS 860
		Scientific and Symbolic Computing	CS 670, CS 672, CS 675, CS 676, CS 679, CS 687, CS 770, CS 774, CS 775, CS 778, CS 779, CS 780, CS 870, CS 887
		Computational Statistics	CS 680, CS 685, CS 786, CS 885
		Quantum Information and Computation	CS 766, CS 768, CS 867
	Applications	Artificial Intelligence	CS 679, CS 684, CS 686, CS 784, CS 785, CS 787, CS 886
		Databases	CS 640, CS 648, CS 740, CS 741, CS 742, CS 743, CS 848, CS 856*
		Graphics and User Interfaces	CS 649, CS 688, CS 781, CS 783, CS 788, CS 789, CS 791, CS 888, CS 889
		Bioinformatics	CS 682, CS 782, CS 882
		Health Informatics	CS 792

- Note: * The versions of CS 856 entitled "Internet-Scale Distributed Data Management" and "Web Data Management" can be used as a Databases course.
- Note: ** CS 858 can be used as a Hardware and Software Systems course or as an Algorithms and

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:

Complexity course, depending on the course offering.
• Master's Research Paper
  ○ Students must present their research paper topic in a publicly announced seminar.
 	
~~**Coursework option:**~~
 	
~~The coursework option includes a specialization in Data Science option. Degree requirements for the specialization in Data Science are outlined below in the "Categories and Areas" table.~~
 	
~~Note: The David R. Cheriton School of Computer Science is not currently accepting applications for the Data Science specialization option.~~
 	
~~• Graduate Academic Integrity Module (Graduate AIM)~~
~~• Courses~~
~~○ Students must complete 8 one-term (0.50 unit weight) graduate courses:~~
~~▪ At least 2 courses must be at the 800 level~~
~~▪ At most 3 courses can be at the 600 level.~~
~~▪ No more than 4 courses can be taken for degree credit in one area.~~
~~○ Normally, courses need to be selected from the Categories and Areas table but exceptions can be granted by the School of Computer Science.~~
	Complexity course, depending on the course offering.
	• Master's Research Paper
	  ○ Students must present their research paper topic in a publicly announced seminar.

~~Category~~	~~Area~~	~~Computer Science (CS) Courses~~
~~Computing Technology~~	~~Software Engineering~~	~~CS 645, CS 646, CS 647, CS 745, CS 746, CS 846~~
	~~Programming Languages~~	~~CS 642, CS 644, CS 744, CS 747, CS 842~~
	~~Hardware and Software Systems~~	~~CS 650, CS 651, CS 652, CS 654, CS~~

Current Graduate Studies Academic Calendar content:				Proposed Graduate Studies Academic Calendar content:
			~~655, CS 656, CS 657, CS 658, CS 755, CS 758, CS 854, CS 856, CS 858**,CS 869~~	
	~~Mathematics of Computing~~	~~Algorithms and Complexity~~	~~CS 662, CS 664, CS 666, CS 758, CS 761, CS 762, CS 763, CS 764, CS 765, CS 767, CS 840, CS 858**, CS 860~~	
		~~Scientific and Symbolic Computing~~	~~CS 670, CS 672, CS 675, CS 676, CS 679, CS 687, CS 770, CS 774, CS 775, CS 778, CS 779, CS 780, CS 870, CS 887~~	
		~~Computational Statistics~~	~~CS 680, CS 685, CS 786, CS 885~~	
		~~Quantum Information and Computation~~	~~CS 766, CS 768, CS 867~~	
	~~Applications~~	~~Artificial Intelligence~~	~~CS 679, CS 684, CS 686, CS 784, CS 785, CS 787, CS 886~~	
		~~Databases~~	~~CS 640, CS 648, CS 740, CS 741, CS~~ 742, CS 743, ~~CS 848, CS 856*~~	
		~~Graphics and User Interfaces~~	~~CS 649, CS 688, CS 781, CS 783, CS 788, CS 789, CS 791, CS 888, CS 889~~	

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

	~~Bioinformatics~~	~~CS 682, CS 782, CS 882~~
	~~Health Informatics~~	~~CS 792~~

- ~~Note: * The versions of CS 856 entitled "Internet-Scale Distributed Data Management" and "Web Data Management" can be used as a Databases course.~~
- ~~Note: ** CS 858 can be used as a Hardware and Software Systems course or as an Algorithms and Complexity course, depending on the course offering.~~

~~Data Science specialization option~~

~~Note: The David R. Cheriton School of Computer Science is not currently accepting applications for the Data Science specialization option.~~

- ~~The requirements for the Data Science specialization option are 8 one-term graduate courses, in addition to any remedial work. Remedial courses cannot be counted towards this number.~~
- ~~Students should take a minimum of 4 CS courses. At least 2 of the CS courses should be at the 700 or 800 level, at least 1 of which should be at the 800 level. A student may not have more than 4 courses from a single area to meet the degree requirements (see "Areas" table below).~~

~~Area~~	~~Courses~~
~~Hardware and Software Systems~~	~~CS 651, CS 654, CS 658, CS 856, CS 858~~
~~Algorithms and Complexity~~	~~CO 602, CO 650, CO 663~~
~~Scientific and Symbolic Computing~~	~~CS 870~~
~~Computational Statistics~~	~~CS 680, CS 685, CS 786, STAT 840,~~

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

	~~STAT 841, STAT 842, STAT 844, STAT 847, STAT 946~~
~~Artificial Intelligence~~	~~CS 686, CS 798, CS 886~~
~~Databases~~	~~CS 648, CS 740, CS 741, CS 743, CS 848~~

- ~~In addition to the above restrictions, students must satisfy the following course requirements:~~
- ~~Foundation course:~~
  - ~~STAT 845 Statistical Concepts for Data Science~~
- ~~Students with a CS major degree are expected to take the foundation course STAT 845. However, CS major students will be exempted from taking STAT 845 if they have a sufficient background in Statistics; instead they will be required to take another STAT course from the elective course list.~~
- ~~Required core courses:~~
  - ~~CS 651 Data-Intensive Distributed Computing~~
  - ~~STAT 847 Exploratory data analysis~~
- ~~CS major students will be exempted from taking CS 651 if they have taken a course equivalent to CS 651; instead they will be required to take another CS course from the elective course list.~~
- ~~1 of the following required breadth courses:~~
  - ~~CS 648 Database Systems Implementation~~
  - ~~CS 680 Introduction to Machine Learning~~
  - ~~CS 685 Machine Learning Theory: Statistical and Computational Foundations~~
- ~~Substitutions of the required breadth courses are possible, subject to the approval of the Graduate Officer.~~
- ~~4 elective courses from the following~~ list:
  - CS 648 Database Systems ~~Implementation~~
  - ~~CS 654 Distributed Systems~~

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:
~~▪ CS 658 Computer Security and Privacy~~ ~~▪ CS 680 Introduction to Machine Learning~~ ~~▪ CS 685 Machine Learning Theory: Statistical and Computational Foundations~~ ~~▪ CS 686 Introduction to Artificial Intelligence~~ ~~▪ CS 740 Database Engineering~~ ~~▪ CS 741 Parallel and Distributed Database Systems~~ ~~▪ CS 743 Principles of Database Management and Use~~ ~~▪ CS 786 Probabilistic Inference and Machine Learning~~ ~~▪ CS 798 Advanced Research Topics~~ ~~▪ CS 848 Advanced Topics in Databases~~ ~~▪ CS 856 Advanced Topics in Distributed Computing~~ ~~▪ CS 858 Advanced Topics in Cryptography, Security and Privacy~~ ~~▪ CS 870 Advanced Topics in Scientific Computing~~ ~~▪ CS 886 Advanced Topics in Artificial Intelligence~~ ~~▪ STAT 840 Computational Inference~~ ~~▪ STAT 841 Statistical Learning: Classification~~ ~~▪ STAT 842 Data Visualization~~ ~~▪ STAT 844 Statistical Learning: Function estimation~~ ~~▪ STAT 946 Topics in Probability and Statistics~~ ~~▪ CO 602 Fundamentals of Optimization~~ ~~▪ CO 650 Combinatorial Optimization~~ ~~▪ CO 663 Convex Optimization and Analysis~~ ~~o Note: CS 798: CS courses at the 800 level, and STAT courses at the 900 level should be on a topic in Data Science; they are subject to the approval of the Graduate Office.~~ ~~o Other advanced courses are offered within the Faculty of Mathematics on topics of Data Science on a more irregular basis. These courses may be~~	

Current Graduate Studies Academic Calendar content:	**Proposed Graduate Studies Academic Calendar content**:

~~taken with approval of the Graduate Officer and course instructor. Similarly, courses offered outside the Faculty, in Data Science or in some area of its application may be approved by the Graduate Officer and the course instructor.~~
• ~~Data Science Requirement~~
  ○ ~~Students must complete the course requirements of the Data Science specialization option in order to satisfy the Data Science Requirement milestone.~~
• ~~Graduate Studies Work Report (note: this milestone is a requirement that is only applicable to the MMath in Computer Science - Co-operative Program)~~
  ○ ~~Co-op requirements: in Computer Science, a master's program may be undertaken on a co-operative basis enabling a student to combine graduate studies with some work experience. The program involves an initial study period, a work period and a final study period. It is fairly flexible in length, each period comprising one or more terms. The usual pattern of study and work consists of two academic terms in which the courses are completed, a two-term work placement, and a final academic term in which the coursework is completed. Students may apply for the co-op option during their second or third term in the Master's program.~~
  ○ ~~The work placement must be relevant to their coursework, and requires the approval of the Director of Graduate Studies and the student's course advisor.~~
  ○ ~~The student will be required to do a two-term work placement at a suitable industrial location, to begin as soon as possible after the coursework or 50% of the degree requirements have been completed. The student will also be expected to return to campus after the work placement in order to complete the remaining coursework. The student will need to supply a work term report along when they return to campus.~~	

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

The students currently enrolled in the coursework study option would not be impacted by this program discontinuation. They would still be able to complete their degree with the course offerings available as that would not change.

Department/School approval date (mm/dd/yy): 10/13/21
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):

3. Calendar changes Applied Math

Motion to add an option for the interdisciplinary aeronautics program for:

- Master of Mathematics in Applied Mathematics
- Doctor of Philosophy in Applied Mathematics

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 and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Program: Master of Mathematics (MMath) in Applied Mathematics - Aeronautics

Program contact name(s): Brian Ingalls

Form completed by: Brian Ingalls

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Applied Mathematics is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Master of Mathematics (MMath) in Applied Mathematics - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Applied Mathematics is joining the CAP because many faculty members from the Department have research interest in aviation and aeronautics systems and related applications. Some graduate students are working on aviation related projects. However, there is a lack of faculty expertise within the Department in the technical aspects of aviation and aeronautics, such as aircraft piloting, navigation, and air traffic control. Joining the CAP will allow current and future students studying aviation and aeronautics systems to gain knowledge and support from CAP courses and advisors. As sustainable aviation becomes an important research area, many students and faculty members could benefit from the CAP.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
MASTER OF MATHEMATICS (MMATH) IN APPLIED MATHEMATICS **Graduate research fields** • Control and Dynamical Systems	**MASTER OF MATHEMATICS (MMATH) IN APPLIED MATHEMATICS - AERONAUTICS** ~~**Graduate research fields**~~

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
• Fluid Mechanics • Mathematical Medicine and Biology • Mathematical Physics • Scientific Computing **Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Program type** o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o Master's Research Paper **Admission requirements** • **Minimum requirements** o An overall 78% average or its equivalent for undergraduate work. o A four-year Honours Bachelor degree with a specialization in Mathematics, or in Science or Engineering with a strong concentration in mathematics. o 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** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3	• ~~Control and Dynamical Systems~~ • ~~Fluid Mechanics~~ • ~~Mathematical Medicine and Biology~~ • ~~Mathematical Physics~~ • ~~Scientific Computing~~ **Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Program type** o Collaborative o Master's o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis o ~~Master's Research Paper~~ **Admission requirements** • **Minimum requirements** o An overall 78% average or its equivalent for undergraduate work. o A four-year Honours Bachelor degree with a specialization in Mathematics, or in Science or Engineering with a strong concentration in mathematics. o 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** o Résumé o Supplementary information form

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
○ Type of references: normally from academic sources. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ 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. ○ Breadth requirement: to satisfy the breadth requirement, students are required to complete 2 courses from the following lists, with no more than 1 course from each list: ▪ Applications: ▪ AMATH 663 Fluid Mechanics ▪ AMATH 673 Quantum Theory 2 ▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations ▪ AMATH 675 Introduction to General Relativity ▪ Computation: ▪ AMATH 642 Computational Methods for Partial Differential Equations ▪ AMATH 740 Numerical Analysis ▪ AMATH 741 Numerical Solution of Partial Differential Equations ▪ Differential Equations: ▪ AMATH 651 Introduction to Dynamical Systems ▪ AMATH 653 Partial Differential Equations 2	○ Transcript(s) • **References** ○ Number of references: 3 ○ Type of references: normally from academic sources. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must complete 4 one-term (0.50 unit) graduate courses, satisfying a breadth requirement <u>and Aeronautics core course requirement</u>. 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. ○ Breadth requirement: to satisfy the breadth requirement, students are required to complete 2 courses from the following lists, with no more than 1 course from each list: ▪ Applications: ▪ AMATH 663 Fluid Mechanics ▪ AMATH 673 Quantum Theory 2 ▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations ▪ AMATH 675 Introduction to General Relativity ▪ Computation: ▪ AMATH 642 Computational Methods for Partial Differential Equations ▪ AMATH 740 Numerical Analysis ▪ AMATH 741 Numerical Solution of Partial Differential Equations

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
▪ AMATH 655 Control Theory ▪ AMATH 751 Advanced Ordinary Differential Equations ▪ AMATH 753 Advanced Partial Differential Equations ▪ Techniques: ▪ AMATH 656 Calculus of Variations ▪ AMATH 677 Stochastic Processes for Applied Mathematics ▪ AMATH 731 Applied Functional Analysis ▪ AMATH 732 Asymptotic Analysis and Perturbation Theory ▪ AMATH 777 Stochastic Processes in the Physical Sciences o Students may not count more than 1 graduate course that is cross-listed with an undergraduate course 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. o 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. • **Master's Thesis** 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	▪ Differential Equations: ▪ AMATH 651 Introduction to Dynamical Systems ▪ AMATH 653 Partial Differential Equations 2 ▪ AMATH 655 Control Theory ▪ AMATH 751 Advanced Ordinary Differential Equations ▪ AMATH 753 Advanced Partial Differential Equations ▪ Techniques: ▪ AMATH 656 Calculus of Variations ▪ AMATH 677 Stochastic Processes for Applied Mathematics ▪ AMATH 731 Applied Functional Analysis ▪ AMATH 732 Asymptotic Analysis and Perturbation Theory ▪ AMATH 777 Stochastic Processes in the Physical Sciences o Aeronautics core course requirement: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 602 Interdisciplinary Aeronautics Project o Students may not count more than 1 graduate course that is cross-listed with an undergraduate course 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. o 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~~. o This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments across several

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
literature. For University guidelines on co-authored material in Masters theses please visit the Graduate Studies and Postdoctoral Affairs website; additional departmental guidelines apply. ○ 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. ○ 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	academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (AVIA 601 and AVIA 602). • **Master's Thesis** ○ The thesis should have a substantial focus on Applied Mathematics and Aeronautics. 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. ○ 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. ○ 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

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
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: to satisfy the breadth requirement, students are required to complete 2 courses from the following lists, with no more than 1 course from each list: ▪ Applications: ▪ AMATH 663 Fluid Mechanics ▪ AMATH 673 Quantum Theory 2 ▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations ▪ AMATH 675 Introduction to General Relativity ▪ Computation: ▪ AMATH 642 Computational Methods for Partial Differential Equations ▪ AMATH 740 Numerical Analysis ▪ AMATH 741 Numerical Solution of Partial Differential Equations ▪ Differential Equations: ▪ AMATH 651 Introduction to Dynamical Systems\ ▪ AMATH 653 Partial Differential Equations 2	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: to satisfy the breadth requirement, students are required to complete 2 courses from the following lists, with no more than 1 course from each list:~~ ▪ ~~Applications:~~

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
▪ AMATH 655 Control Theory ▪ AMATH 751 Advanced Ordinary Differential Equations ▪ AMATH 753 Advanced Partial Differential Equations ▪ Techniques: ▪ AMATH 656 Calculus of Variations ▪ AMATH 677 Stochastic Processes for Applied Mathematics ▪ AMATH 731 Applied Functional Analysis ▪ AMATH 732 Asymptotic Analysis and Perturbation Theory ▪ AMATH 777 Stochastic Processes in the Physical Sciences o 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. o 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. • **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.	~~▪ AMATH 663 Fluid Mechanics~~ ~~▪ AMATH 673 Quantum Theory 2~~ ~~▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations~~ ~~▪ AMATH 675 Introduction to General Relativity~~ ~~▪ Computation:~~ ~~▪ AMATH 642 Computational Methods for Partial Differential Equations~~ ~~▪ AMATH 740 Numerical Analysis~~ ~~▪ AMATH 741 Numerical Solution of Partial Differential Equations~~ ~~▪ Differential Equations:~~ ~~▪ AMATH 651 Introduction to Dynamical Systems~~\ ~~▪ AMATH 653 Partial Differential Equations 2~~ ~~▪ AMATH 655 Control Theory~~ ~~▪ AMATH 751 Advanced Ordinary Differential Equations~~ ~~▪ AMATH 753 Advanced Partial Differential Equations~~ ~~▪ Techniques:~~ ~~▪ AMATH 656 Calculus of Variations~~ ~~▪ AMATH 677 Stochastic Processes for Applied Mathematics~~ ~~▪ AMATH 731 Applied Functional Analysis~~ ~~▪ AMATH 732 Asymptotic Analysis and Perturbation Theory~~ ~~▪ AMATH 777 Stochastic Processes in the Physical Sciences~~ ~~o 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~~

Current MMath in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed MMath in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
	~~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.~~ • ~~**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.~~

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

Currently registered students will be permitted to transition to the CAP program.

Department/School approval date (03/10/22):
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy): 03/23/22
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 and Postdoctoral Affairs (GSPA).

Faculty: Mathematics

Program: Doctor of Philosophy (PhD) in Applied Mathematics - Aeronautics

Program contact name(s): Brian Ingalls

Form completed by: Brian Ingalls

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

The Department of Applied Mathematics is joining the Collaborative Aeronautics Program (CAP) and is thus adding a Doctor of Philosophy (PhD) in Applied Mathematics - Aeronautics program. The CAP is expected to go into effect in fall 2022 pending Senate approval.

Rationale for change(s):

The Department of Applied Mathematics is joining the CAP because many faculty members from the Department have research interest in aviation and aeronautics systems and related applications. Some graduate students are working on aviation related projects. However, there is a lack of faculty expertise within the Department in the technical aspects of aviation and aeronautics, such as aircraft piloting, navigation, and air traffic control. Joining the CAP will allow current and future students studying aviation and aeronautics systems to gain knowledge and support from CAP courses and advisors. As sustainable aviation becomes an important research area, many students and faculty members could benefit from the CAP.

Please refer to the attached brief for additional details.

Proposed effective date: Term: Fall Year: 2022

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

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
DOCTOR OF PHILOSOPHY (PHD) IN APPLIED MATHEMATICS **Graduate research fields** • Control and Dynamical Systems	**DOCTOR OF PHILOSOPHY (PHD) IN APPLIED MATHEMATICS - AERONAUTICS** ~~**Graduate research fields**~~

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
• Fluid Mechanics • Mathematical Medicine and Biology • Mathematical Physics • Scientific Computing **Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Program type** o Doctoral o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o Minimum grade point average: 78% or its equivalent. o It is absolutely essential that the application for admission into the program contain evidence of potential for performing original research. This should be provided by successful completion of a Master's thesis in a mathematics-related discipline. o In some circumstances a student enrolled in the MMath program (thesis) in Applied Mathematics may transfer to the PhD program without completing their MMath program. • **Application materials** o Résumé o Supplementary information form o Transcript(s) • **References** o Number of references: 3	~~• Control and Dynamical Systems~~ ~~• Fluid Mechanics~~ ~~• Mathematical Medicine and Biology~~ ~~• Mathematical Physics~~ • ~~Scientific Computing~~ **Program information** • **Admit term(s)** o Fall o Winter o Spring • **Delivery mode** o On-campus • **Program type** o <u>Collaborative</u> o Doctoral o Research • **Registration option(s)** o Full-time o Part-time • **Study option(s)** o Thesis **Admission requirements** • **Minimum requirements** o Minimum grade point average: 78% or its equivalent. o It is absolutely essential that the application for admission into the program contain evidence of potential for performing original research. This should be provided by successful completion of a Master's thesis in a mathematics-related discipline. o In some circumstances a student enrolled in the MMath program (thesis) in Applied Mathematics may transfer to the PhD program without completing their MMath program. • **Application materials** o Résumé o Supplementary information form

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
○ Type of references: normally from academic sources. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** The program of studies of a PhD student is directed by a PhD Advisory Committee consisting of the supervisor(s) and two other faculty members. This committee should be approved (by the graduate officer) within three terms of enrollment. At least one of the two other members should be from (or cross-appointed to) the Department, and one of the members should be from outside the research group of the supervisor(s). • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must complete 4 one-term (0.50 unit) graduate courses after the Master's degree, satisfying a breadth requirement, or 8 one-term (0.50 unit) graduate courses after the Bachelor's degree, satisfying a breadth requirement. Candidates for the PhD 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: to satisfy the breadth requirement, students are required to complete 3 courses from the following lists, with no more than 1 course from each list: ▪ Applications: ▪ AMATH 663 Fluid Mechanics ▪ AMATH 673 Quantum Theory 2 ▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations	○ Transcript(s) • **References** ○ Number of references: 3 ○ Type of references: normally from academic sources. • **English language proficiency (ELP)** (if applicable) **Degree requirements** **Thesis option:** The program of studies of a PhD student is directed by a PhD Advisory Committee consisting of the supervisor(s) and two other faculty members. This committee should be approved (by the graduate officer) within three terms of enrollment. At least one of the two other members should be from (or cross-appointed to) the Department, and one of the members should be from outside the research group of the supervisor(s). • **Graduate Academic Integrity Module (Graduate AIM)** • **Courses** ○ Students must complete 4 one-term (0.50 unit) graduate courses after the Master's degree, satisfying a breadth requirement and Aeronautics core course requirement, or 8 one-term (0.50 unit) graduate courses after the Bachelor's degree, satisfying a breadth requirement and Aeronautics core course requirement. Candidates for the PhD 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: to satisfy the breadth requirement, students are required to complete 3 courses from the following lists, with no more than 1 course from each list: ▪ Applications: ▪ AMATH 663 Fluid Mechanics

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
▪ AMATH 675 Introduction to General Relativity ▪ Computation: ▪ AMATH 642 Computational Methods for Partial Differential Equations ▪ AMATH 740 Numerical Analysis ▪ AMATH 741 Numerical Solution of Partial Differential Equations ▪ Differential Equations: ▪ AMATH 651 Introduction to Dynamical Systems ▪ AMATH 653 Partial Differential Equations 2 ▪ AMATH 655 Control Theory ▪ AMATH 751 Advanced Ordinary Differential Equations ▪ AMATH 753 Advanced Partial Differential Equations ▪ Techniques: ▪ AMATH 656 Calculus of Variations ▪ AMATH 677 Stochastic Processes for Applied Mathematics ▪ AMATH 731 Applied Functional Analysis ▪ AMATH 732 Asymptotic Analysis and Perturbation Theory ▪ AMATH 777 Stochastic Processes in the Physical Sciences ○ Students may not count more than 1 graduate course that is cross-listed with an undergraduate course for credit towards their PhD degree. This restriction applies to all 600-level AMATH courses and any cross-listed courses offered by other departments. Note: students who transfer directly into the PhD program (without completing the Master's degree) may take up to 2 cross-listed courses. ○ If a PhD student has taken an equivalent course during a Master's	▪ AMATH 673 Quantum Theory 2 ▪ AMATH 674 Quantum Theory 3: Quantum Information and Foundations ▪ AMATH 675 Introduction to General Relativity ▪ Computation: ▪ AMATH 642 Computational Methods for Partial Differential Equations ▪ AMATH 740 Numerical Analysis ▪ AMATH 741 Numerical Solution of Partial Differential Equations ▪ Differential Equations: ▪ AMATH 651 Introduction to Dynamical Systems ▪ AMATH 653 Partial Differential Equations 2 ▪ AMATH 655 Control Theory ▪ AMATH 751 Advanced Ordinary Differential Equations ▪ AMATH 753 Advanced Partial Differential Equations ▪ Techniques: ▪ AMATH 656 Calculus of Variations ▪ AMATH 677 Stochastic Processes for Applied Mathematics ▪ AMATH 731 Applied Functional Analysis ▪ AMATH 732 Asymptotic Analysis and Perturbation Theory ▪ AMATH 777 Stochastic Processes in the Physical Sciences ○ Aeronautics core course requirement: ▪ AVIA 601 Interdisciplinary Aeronautics ▪ AVIA 802 Interdisciplinary Aeronautics Project - PhD Level ○ Exception: Students who have already completed AVIA 601 and AVIA 602 as

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
program, this can be counted (upon approval from the Graduate Officer) towards completion of the breadth requirement but does not reduce the number of courses required ○ 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. • **PhD Comprehensive Examination** ○ Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Mathematics Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements. ▪ Timing: Consistent with University-level minimum requirements. ▪ Committee: Consistent with University-level minimum requirements. Note: The Faculty of Mathematics wishes to use the option to have the committee approved by a delegate of the Associate Dean, namely by the Graduate Officer in the home department of the student. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: In the Faculty of Mathematics, when a student needs to submit a	part of their Masters Aeronautics degree, must complete the following course requirements: ▪ AVIA 802 Interdisciplinary Aeronautics Project - PhD Level or 1 elective graduate course that is applicable to aeronautics (approved by their supervisor with support from the Director of the CAP program) ○ Students may not count more than 1 graduate course that is cross-listed with an undergraduate course for credit towards their PhD degree. This restriction applies to all 600-level AMATH courses and any cross-listed courses offered by other departments. Note: students who transfer directly into the PhD program (without completing the Master's degree) may take up to 2 cross-listed courses. ○ If a PhD student has taken an equivalent course during a Master's program, this can be counted (upon approval from the Graduate Officer) towards completion of the breadth requirement but does not reduce the number of courses required ○ 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~~. ○ This degree is offered through the Collaborative Aeronautics Program. This program, jointly offered by a range of departments across several academic faculties, promotes the development of interdisciplinary perspectives on aeronautics. Collaborative Aeronautics Program students complete their specialist training in their respective home departments, while working with colleagues from a variety of other departments in core interdisciplinary courses (AVIA 601 and AVIA 602/802).

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	**Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content**:
written document to their comprehensive examination committee prior to the examination, they are required to sign an acknowledgement form affirming their work does not violate the University policy on Academic Integrity. Students are also encouraged to use a plagiarism detection software and include its report with the submission of their written document. Furthermore, the comprehensive examination committee may require the student to use such software and include the report it generated with the submission of their written component. ○ In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in Applied Mathematics program are also required to meet the following requirements: ▪ During the third term of enrollment, the candidate will give a 30-minute pre-comprehensive seminar on the proposed research area, emphasizing background material. Shortly thereafter the advisory committee shall decide on the background topics that will comprise the candidate's comprehensive exam. The student will be informed of the areas of examination 3-4 months prior to the comprehensive examination. ▪ The comprehensive examination is to be completed by the end of the student's fifth term. The candidate will prepare a written research proposal (approximately 25 pages) that will be submitted to the members of the advisory committee and the examination chair (normally the graduate officer) at least two weeks prior to the comprehensive	• **PhD Comprehensive Examination** ○ Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted differences that are specific to the Faculty of Mathematics Comprehensive Examination minimum requirements: ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements. ▪ Timing: Consistent with University-level minimum requirements. ▪ Committee: Consistent with University-level minimum requirements. Note: The Faculty of Mathematics wishes to use the option to have the committee approved by a delegate of the Associate Dean, namely by the Graduate Officer in the home department of the student. ▪ Who Chairs an examination: Consistent with University-level minimum requirements. ▪ Format / Content: Consistent with University-level minimum requirements. ▪ Academic integrity: In the Faculty of Mathematics, when a student needs to submit a written document to their comprehensive examination committee prior to the examination, they are required to sign an acknowledgement form affirming their work does not violate the University policy on Academic Integrity. Students are also encouraged to use a plagiarism detection software and include its report with the submission of their written document. Furthermore, the comprehensive examination committee may require the

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
examination. The proposal should describe the research problem, together with motivation, literature review, an indication of methodology, any progress made to date, and a research plan with timeline. ▪ Shortly before the comprehensive examination, the examination chair (through the graduate coordinator) will consult with the advisory committee to determine whether the committee wishes the exam to proceed and, if so, whether the committee wishes to meet to discuss the questions to be asked on background material. Each committee member will provide a typeset list of questions to the graduate coordinator four business days before the exam (about 3-5 questions, which can all be answered at a whiteboard in about 15 minutes). This list of questions will be provided to the candidate one hour prior to the start of the exam. The candidate will use this time to prepare answers, with no access to outside materials. ▪ The examination will consist of a 20 minute presentation of the proposed research followed by two rounds of questions: the first on the prepared background questions, the second on the research proposal and the relevant literature. Each examiner shall question the candidate for approximately 15 minutes in each round. If there is more than one supervisor, they will share the allotted 15 minute time-slot. The comprehensive examination should normally be completed in two hours, after which the committee will consider the student's progress to date, the proposal, and the	student to use such software and include the report it generated with the submission of their written component. o In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in Applied Mathematics program are also required to meet the following requirements: ▪ During the third term of enrollment, the candidate will give a 30-minute pre-comprehensive seminar on the proposed research area, emphasizing background material. Shortly thereafter the advisory committee shall decide on the background topics that will comprise the candidate's comprehensive exam. The student will be informed of the areas of examination 3-4 months prior to the comprehensive examination. ▪ The comprehensive examination is to be completed by the end of the student's fifth term. The candidate will prepare a written research proposal (approximately 25 pages) that will be submitted to the members of the advisory committee and the examination chair (normally the graduate officer) at least two weeks prior to the comprehensive examination. The proposal should describe the research problem, together with motivation, literature review, an indication of methodology, any progress made to date, and a research plan with timeline. ▪ Shortly before the comprehensive examination, the examination chair (through the graduate coordinator) will consult with the advisory committee to determine whether the committee wishes the exam to proceed and, if so, whether

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
student's performance in the exam. Students who have not satisfactorily completed the comprehensive examination by the end of the fifth term will have their progress reviewed by the Departmental Graduate Chair. • **PhD Lecturing Requirement** o This requirement is normally met by teaching a one-term undergraduate course, usually at the first or second year level, under the supervision of a faculty member. Students will satisfy this requirement after completing the comprehensive examination and after obtaining experience as a teaching assistant. If the department is unable to provide the student with a suitable undergraduate course to teach, the requirement may be met by giving a series of lectures of an introductory nature concerning the student's field of research. • **PhD Thesis** o A PhD thesis contains original results that warrant publication in the research literature. Indeed, candidates are encouraged to publish papers based on their research before submitting their theses. Moreover, the Department expects a PhD thesis to be a scholarly work that is broad in scope. As such, it should contain a discussion of the history of the research problem and an analysis of the relevant literature. For University guidelines on co-authored material in PhD theses please visit the Graduate Studies and Postdoctoral Affairs website; additional departmental guidelines apply. o The candidate shall defend the thesis in an oral examination before an Examining Committee, which shall consist of the Advisory Committee, one faculty member from outside the Department, and an external examiner familiar with the student's research field.	the committee wishes to meet to discuss the questions to be asked on background material. Each committee member will provide a typeset list of questions to the graduate coordinator four business days before the exam (about 3-5 questions, which can all be answered at a whiteboard in about 15 minutes). This list of questions will be provided to the candidate one hour prior to the start of the exam. The candidate will use this time to prepare answers, with no access to outside materials. ▪ The examination will consist of a 20 minute presentation of the proposed research followed by two rounds of questions: the first on the prepared background questions, the second on the research proposal and the relevant literature. Each examiner shall question the candidate for approximately 15 minutes in each round. If there is more than one supervisor, they will share the allotted 15 minute time-slot. The comprehensive examination should normally be completed in two hours, after which the committee will consider the student's progress to date, the proposal, and the student's performance in the exam. Students who have not satisfactorily completed the comprehensive examination by the end of the fifth term will have their progress reviewed by the Departmental Graduate Chair. • **PhD Lecturing Requirement** o This requirement is normally met by teaching a one-term undergraduate course, usually at the first or second year level, under the supervision of a faculty member. Students will satisfy

Current PhD in Applied Mathematics Graduate Studies Academic Calendar content:	Proposed PhD in Applied Mathematics - Aeronautics Graduate Studies Academic Calendar content:
	this requirement after completing the comprehensive examination and after obtaining experience as a teaching assistant. If the department is unable to provide the student with a suitable undergraduate course to teach, the requirement may be met by giving a series of lectures of an introductory nature concerning the student's field of research. • **PhD Thesis** o The thesis should have a substantial focus on Applied Mathematics and Aeronautics. A PhD thesis contains original results that warrant publication in the research literature. Indeed, candidates are encouraged to publish papers based on their research before submitting their theses. Moreover, the Department expects a PhD thesis to be a scholarly work that is broad in scope. As such, it should contain a discussion of the history of the research problem and an analysis of the relevant literature. For University guidelines on co-authored material in PhD theses please visit the Graduate Studies and Postdoctoral Affairs website; additional departmental guidelines apply. o The candidate shall defend the thesis in an oral examination before an Examining Committee, which shall consist of the Advisory Committee, one faculty member from outside the Department, and an external examiner familiar with the student's research field.

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

Currently registered students will be permitted to transition to the CAP program.

Department/School approval date (03/10/22):
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy): 03/23/22
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 Studies and Postdoctoral Affairs

April 25, 2022

TO: Kathy Winter, Assistant University Secretary and Privacy Officer, Senate Graduate and Research Council

FROM: Heidi Mussar, Associate Director, Graduate Financial Aid & Awards

RE: Agenda items for Senate Graduate & Research Council – May 2022

Items for Approval

a) Adosi Graduate Scholarship for Food & Agriculture – trust

A scholarship, valued at $1,500, will be awarded annually to a full-time graduate student enrolled in the Master's program in the School of Architecture in the Faculty of Engineering. Selection will be based on the student's demonstrated interested in researching food and agriculture as demonstrated in their research proposal as part of their scholarship application. Students interested in applying must submit an application form that can be found on the School of Architecture website, by the deadline advertised. This fund is made possible by a donation from Douglas Miller, Simran Duggal, and Ada Miller, to encourage the exploration of food and agriculture, creating opportunity for fresh perspectives, new ideas, understanding past traditions, and asking questions that relate to the topic.

The period of this defined term award will be from 2022 to 2029.
Total gift = $12,000

b) Janet E.A. McDougall Graduate Scholarship in Pharmacy – endowment

Scholarships valued at up to $15,000, will be awarded annually to full-time graduate student(s) enrolled in the master's or doctoral program in the School of Pharmacy in the Faculty of Science. Selection is based on academic excellence (minimum cumulative average of 80% or equivalent in their current program or over the last two full-time academic years) combined with a passion for improving medication, health outcomes, and/or health related issues as demonstrated through a combination of research, community engagement and/or professional practice. Interested students should submit an application, that can be found on the School of Pharmacy website, by April 1. This fund is made possible by a donation from Lynne Howarth in memory of Janet McDougall.

Total gift = $500k

Items for Information

c) Doctoral Thesis Completion Award – operating

After receiving feedback and reviewing the terms of the DTCA, Graduate Studies and Postdoctoral Affairs is proposing amendments to the current eligibility requirements as indicated below.

Current:

The recipient must meet the following criteria:

- Have a proven high level of productivity/excellence as a doctoral student;
- Must defend and submit the final version of their thesis within two terms of application;

- Must not hold full-time or part-time employment during the term in which they receive this award;
- Must not hold any external awards during the term in which they receive this award.

Inability of an award holder to meet these conditions may result in the student having to repay the funds.

Proposed:

Candidates must meet the following criteria:

- be registered full time in a PhD program;
- be in good academic standing with a realistic plan of completing their degree within 1-2 terms* of receiving the award;
- preference will be given to doctoral students who are no longer receiving minimum funding[+] and/or have experienced research interruptions that were beyond the student's control.

*With the adjustments to the criteria, GSPA will no longer require repayment of the award if students do not complete within two terms of receiving the award. Our experience suggests that there have been very few instances where this previous requirement was enforced and given the modest number of awards, the risk of discontinuing this stated requirement is low. However, a change of enrolment status and repayment based on University of Waterloo's tuition and fee refund deadlines will still apply.

[+]In order to support students who are no longer receiving minimum funding, the criterion of students not being permitted to hold full-time or part-time employment concurrently with this award, is being removed. GSPA interprets this change as being consistent with the motivation of relaxing the "10-hour rule" – providing students greater agency in managing their financial well-being.

Additionally, based on the observation that Indigenous scholarship tends to require longer timelines as a result of both research methods and content, and to align with the principles embodied in the University's approach to developing Indigenous initiatives, up to three awards will be reserved annually specifically for students who identify as Indigenous.

The process by which these awards will be administered includes the following:

- the annual base allocation will be reduced from 39 to 36 and distributed to the faculties based on doctoral enrolment.
- if, at the end of the fiscal year, any of these awards remain unallocated, the base allocation will increase in the next fiscal year to include the previous year's unallocated awards (e.g., 39 awards will be allocated to the faculties plus three awards will be reserved for Indigenous applicants).

If, in any term, more Indigenous students qualify than awards are available, an ad hoc committee will be formed to select the recipients, based on terms to be crafted collectively. Those Indigenous students who applied but were not selected may be recommended to receive an award from the faculty allocation.

d) Harvey Bains and Ben Kaak Doctoral Award – trust

Originally approved at SG&RC in April 2021, the terms are being amended to change the annual timing of the award: the goal will be to award it in the spring term; however, if an eligible recipient cannot be found, the award will be promoted again in the fall and /or winter term, as appropriate in order to maximize the chance of awarding it annually.

e) Buitrago Opportunity Graduate Scholarship – trust

Previously approved in October 2021, the terms have been amended to modify the award criteria, reducing the required cumulative average from 80% to 75%, with the goal of increasing the number of eligible students. The rest of the criteria remains the same.

f) Master of Environment and Business Award – operating

Originally created in 2017 and amended in 2019, the Master of Environment and Business program would again like to amend the award description for this award:

From current:

The Master of Environment and Business Awards are available annually to eligible MEB students who are currently registered or will be registered in the MEB program and who are not receiving full tuition funding from their employer or another source. Selection will be based on diversity of sector involvement in a specific cohort as well as financial need. Financial need will be based on personal/household income. Students may apply annually if their individual income is less than $50,000/year, or in the case of married students, less than $100,000/year. Application forms will be emailed annually in April to all MEB students. Consideration for late applications is subject to funding availability.

To proposed:

The Master of Environment and Business Awards are available annually to eligible MEB students who are currently registered or will be registered in the MEB program and who are not receiving full tuition funding from their employer or another source. Selection will be based on diversity of sector involvement in a specific cohort as well as financial need. Financial need will be based on personal/household income. Students may apply annually if their individual income is less than $50,000/year, or in the case of married students, less than $100,000/year. Interested applicants are to complete and submit the application form, which can be found on the SEED website, to the Graduate Program Administrator by May 31. Consideration for late applications is subject to available funding.

g) Dr. Derick Wood Graduate Scholarship in Computer Science – endowment

Originally approved by SG&RC in September 2010, the award is being amended as follows:

- Adjusting the name of the scholarship in the actual agreement to reflect how it has been referred to in award listings since its establishment (Dr. Derick Wood…)

- Updating the value and selection criteria to be more detailed and precise:

  Current:

  "The value of each scholarship will be between $2,000 and $10,000 per year. The David R. Cheriton School of Computer Science may change the amount of scholarship from time to time, and/or decide to offer multiple scholarships, funds permitting."

  A scholarship valued at $2,000-$10,000 awarded annually to full-time graduate students enrolled in the Masters/Doctoral program in the David R. Cheriton School of Computer Science in the Faculty of Mathematics on the basis of scholastic excellence and evidence of research potential, as indicated by publications and letters of reference. Preference will be given to PhD students and to students whose research area is Algorithms and Complexity. It is renewable and open to both Canadian and international students holding a student visa. This fund is made possible by a donation from Mary Chen in honour of her husband.

Amended:
"The goal is to provide at least one $10,000 Award each year to a PhD candidate. If a suitable PhD candidate cannot be awarded, the fund may award two awards at $5,000 each to master's students. The value and/or number of Awards may change from year to year."

A scholarship, valued at up to $10,000, will be awarded annually to a graduate student registered full time in the doctoral program of the David R. Cheriton School of Computer Science in the Faculty of Mathematics. If a suitable candidate cannot be found, two awards at $5,000 each may be awarded to students registered full time in the master's program. Selection will be based on the student's performance in the program; the selection committee will consider academic excellence (minimum cumulative average of 80% or equivalent in the last two full-time academic years) and evidence of research potential, as indicated by publications and/or letters of reference. Preference will be given to students who are conducting research in Algorithms and Complexity. This fund is made possible by the donations of family, friends, and colleagues in memory of Dr. Derick Wood.