FOR APPROVAL **PUBLIC** **OPEN SESSION**

TO:	UTM Academic Affairs Committee
SPONSOR:	Professor William A. Gough, Interim Vice-Principal Academic & Dean
CONTACT INFO:	vpdean.utm@utoronto.ca
PRESENTER:	Professor Bryan Stewart, Vice-Dean, Academic Programs
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DATE:	May 1, 2025, for May 8, 2025
AGENDA ITEM:	4

ITEM IDENTIFICATION:

Major Modification: New Freestanding Minor in Logic, UTM

JURISDICTIONAL INFORMATION:

Under section 5.6 of its terms of reference, the Academic Affairs Committee is responsible for major and minor modifications to existing degree programs. All major modifications shall be reported annually for information to the Committee on Academic Policy and Programs.

GOVERNANCE PATH:

1. **UTM Academic Affairs Committee [For Approval] (May 8, 2025)**

PREVIOUS ACTION TAKEN:

No previous action taken.

HIGHLIGHTS:

The Department of Philosophy at the University of Toronto Mississauga (UTM Philosophy) is proposing a new freestanding Minor in Logic in response to growing interest from students outside the humanities, particularly those in fields like mathematics, computer science, and physics. The proposed Minor will be useful for students aiming for careers in law, software programming, data science, engineering, and other areas where logical reasoning is utilized.

The goal of the Minor is to give students a solid understanding of modern logic. This includes being able to critically assess arguments, work with symbolic reasoning, and understand the connections between logic, philosophy, math, and computer science. Student survey data

shows there is a strong demand for a Logic Minor, particularly from students outside the humanities, including those in mathematics and computational sciences and physics. Students will learn problem-solving skills, explore the development of logic, and study how it relates to other fields. The program requirements allow students to focus on different aspects of logic based on their interests, such as inductive reasoning, deductive logic, or the philosophy of logic.

The proposed Minor will also expose a greater number of students to philosophy studies, and specifically logic, to help them develop valuable skills in critical thinking, clear writing, and proficiency in analyzing arguments. The Minor in Logic joins, and is expected to follow the success of, other minor programs in the department, including the Minor in Ethics, Law, and Society and Minor in Philosophy of Science. These Minors have grown steadily and are now well-enrolled programs attracting students from various disciplines; the Logic Minor is designed to appeal especially to those in technical fields that already use logic and formal reasoning.

Broad consultation on the new Minor has held tri-campus. The proposal has been presented to tri-campus Deans and shared with the Department of Mathematical and Computational Sciences at UTM, the Departments of Computer Science, Mathematics, Statistical Sciences, Philosophy, and Physics, and Cognitive Science program at FAS, and the Department of Philosophy at UTSC. In addition, surveys of students at UTM in Mathematical and Computer Science, and Physics programs, showed strong support for the new Minor.

FINANCIAL IMPLICATIONS:

There are no financial implications to the campus operating budget.

RECOMMENDATION:

Be It Resolved,

THAT the new Freestanding Minor in Logic, in the Department of Philosophy, UTM, as detailed in the proposal dated April 17, 2025, be approved, effective September 1, 2025.

DOCUMENTATION PROVIDED:

Major Modification Proposal: New Freestanding Minor in Logic, UTM

University of Toronto
Major Modification Proposal:
Add Program Structure
(Freestanding Minor, Specialist or Major where one exists, Stream, Field, or Concentration)

Program being modified: Please specify what program and the components being created; e.g., New stream in the Specialist in History called….	New Freestanding Minor in Logic
Program of Study Code(s): Indicate if new POSt is needed	[Requires new POSt code]
Proposed major modification:	Introducing a new Freestanding Minor
Department/unit (if applicable):	UTM Department of Philosophy
Faculty/academic division:	University of Toronto Mississauga
Dean's Office contact:	Bryan Stewart Vice Dean, Academic Programs vdacademicprog.utm@utoronto.ca Ferzeen Sammy Manager, Academic Programs, Reviews, and Quality Assurance ferzeen.sammy@utoronto.ca
Proponent:	Gurpreet Rattan Professor & Chair of Philosophy gurpreet.rattan@utoronto.ca
Version date: Please update as you edit this proposal.	April 17, 2025

Framework for UTQAP Major Modifications

The University of Toronto Quality Assurance Process (UTQAP) supports a structured approach for creating, reflecting on, assessing, and developing plans to change and improve academic programs and units in the context of institutional and divisional commitments and priorities.

The University of Toronto (U of T), in its Statement of Institutional Purpose (1992), articulates its mission as a commitment "to being an internationally significant research university, with undergraduate, graduate, and professional programs of excellent quality." Thus “quality assurance through assessment of new program proposals and review of academic programs and units in which they reside is a priority for the University…:”

> The quality of the scholarship of the faculty, and the degree to which that scholarship is brought to bear in teaching are the foundations of academic excellence. More generally, all of the factors that contribute to collegial and scholarly life — academic and administrative complement, research and scholarly activity, infrastructure, governance, etc. — bear on the quality of academic programs and the broad educational experience of students. (*Policy for Approval and Review of Academic Programs and Units* (2010))

The University’s approach to quality assurance is built on two primary indicators of academic excellence: the quality of the scholarship and research of faculty; and the success with which that scholarship and research is brought to bear on the achievement of Degree-Level Expectations.

These indicators are assessed by determining how our scholarship, research and programs compare to those of our international peer institutions and how well our programs meet their Degree-Level Expectations.

The University of Toronto embraces academic change as a critical part of maintaining and enhancing programs of outstanding quality through a process of continuous improvement. Proposals for major modifications are vehicles of academic change.

Major Modification Proposal

A major modification to an existing program is a restructuring of a program, a merger of or the creation of new elements within existing programs, or a renewal of a program in order to keep it current with its academic discipline or improve student academic experience.

This template should be used to bring forward proposals for major modifications to:

- Create of a new program of specialization where another with the same designation already exists (e.g., a new specialist program where a major with the same designation already exists);
- Addition of a new major or specialist that does not differ substantially in program requirements or learning outcomes from an existing program;
- Merger of two or more existing programs;
- Create a minor where there is no existing program of specialization (i.e., a "freestanding minor");
- Create a field or concentration within an existing graduate program;
- Creation a stream within an existing undergraduate program;

This template aligns with UTQAP requirements and will help to ensure that all evaluation criteria established by the Quality Council are addressed in bringing forward a proposal. Divisions may have additional requirements that should be integrated into the proposal. Examples of major modifications are provided in UTQAP 3.1. See the VPAP website for more information on major modifications.

Development and Approval Steps	**Date (e.g., of final sign off, governance meeting, inclusion in reports)**
Dean's office sign-off	April 17, 2025
VPAP sign-off	April 10, 2025
Unit-level approval (if required)	March 18, 2025
Faculty/divisional governance	May 8, 2025
Faculty/division submits final proposal to VPAP	May 8, 2025
Included in Major Modification Report to AP&P	May 13, 2025
Included in Major Modification Report to Quality Council	July 31, 2025

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1.Executive Summary

- Please provide a brief summary of the change(s) being proposed as it relates to the current structure of the program.

The Department of Philosophy at the University of Toronto Mississauga (UTM Philosophy) is proposing a new freestanding Minor in Logic, with expected enrolment starting on September 1, 2025. This program is being introduced in response to growing interest, in logic, from students outside the Humanities (as evidenced by strong course enrolments), particularly those in fields like Mathematics, Computer Science, and Physics. The proposed Logic Minor will be useful for students aiming for careers in law, software programming, data science, engineering, and other areas where logical reasoning is utilized.

The goal of the Minor is to give students a solid understanding of modern logic. This includes being able to critically assess arguments, work with symbolic reasoning, and understand the connections between logic, philosophy, math, and computer science. Student survey data shows there is a strong demand for a Logic Minor, particularly from students outside the humanities, including those in mathematics, computational sciences and physics. Students will learn problem-solving skills, explore the development of logic, and study how it relates to other fields. The program requirements allow students to focus on different aspects of logic based on their interests, such as inductive reasoning, deductive logic, or the philosophy of logic.

The proposed Minor will also expose a greater number of students to philosophy studies, and specifically logic, to help them develop valuable skills in critical thinking, clear writing, and proficiency in analyzing arguments. The Minor in Logic joins, and is expected to follow the success of, other minor programs in the department, including the Minor in Ethics, Law, and Society and Minor in Philosophy of Science. These successful minor programs have grown steadily and are now well-enrolled programs attracting students from various disciplines; the Logic Minor is designed to appeal especially to those in technical fields that already use logic and formal reasoning.

Effective Date

- Please indicate when students may first be enrolled in the changed program or new option. If creating something new within a program, please state when the new option will first be reviewed and through which unit.

Effective date: The start date for the proposed Minor, and the date that students can begin enrolling in it, is September 1, 2025.

Date of first review: The Logic Minor will be reviewed with other UTM Philosophy programs. The next cyclical review is scheduled to take place in Winter 2027.

2. Calendar Copy

- Insert calendar copy, including the program description, with all changes tracked or highlighted.

Logic - Minor (Arts)
This program provides students with training in and an understanding of logic. Logic is a discipline that studies, and aims to precisely characterize, the general features of good reasoning, inference, and argumentation. It also examines specific topics concerning reasoning in particular domains of inquiry and thought (e.g., the logic of necessity/possibility, decision, and probability). Students are required to take courses in philosophy, mathematics, computer science, and/or statistics. Courses should be selected in consultation with the Faculty Advisor.

Completion Requirements:

4.0 credits are required including at least 1.0 credit at the 300/400 level.

Core Requirements

1. **1.0 credit** from PHL239H5 or PHL245H5 or PHL246H5;
2. **1.0 credit** from PHL345H5 or PHL346H5 or PHL347H5 or PHL445H5 or PHL447H5;

Elective Requirements

3. **0.5 credit** from PHL103H5 or PHL233H5 or PHL258H5 or PHL325H5 or PHL327H5 or PHL332H5 or PHL350H5 or PHL354H5 or PHL 360H5 or PHL450H5;

4. **1.0 credit** from CSC or MAT or STA;
5. **0.5 credit** from CSC or MAT or STA or from courses listed in #1 or #2 or #3 above.

Notes:
Students cannot use more than 1.0 credits from 100-level PHL courses for program completion credit.

Alternate elective options for either PHL or CSC/MAT/STA courses may be taken with the approval of the Department. Contact the PHL Academic Advisor for more information.
Where courses exclude each other, at most one of them may be counted for credit toward philosophy program completion.

Be sure to look ahead and plan to complete the prerequisites for any upper-level courses that are of interest to you. For questions, please contact the PHL Academic Advisor.

When choosing your courses, keep in mind that not all courses listed are offered every year. Some courses required to complete a program might be offered only every other year. For courses offered during the current year, consult Timetable Builder.

3.Academic Rationale and Program Objectives

Program Objectives

a) State the program's objectives.

The objective of the proposed freestanding Minor in Logic is to provide students with a basic competence in modern logic, understood to consist of:

1. Proficiency in critical, rigorous evaluation of inferences and arguments, across a range of contexts,
2. Proficiency in symbolic reasoning and understanding of symbolic systems and their mathematical properties, and
3. Understanding of logic as a discipline: an understanding of the philosophical issues that arise in the study of logic, the history and development of the discipline, and its relationship to cognate areas of mathematics, computer science, and statistics.

In the Department's 2019 self-study, the Chair recognized three items as the Department's "overall learning objectives" for each course and program that it offers:

1. **Cultivate critical thinking, intellectual rigour, and creativity**: Students develop competencies in critically evaluating beliefs, arguments, and practices, one's own and others; clarity in thought, writing, and communication; creativity in approaching and tackling theoretical, practical, and personal challenges.
2. **Acquire competence with a wide range of topics in the history of philosophy and contemporary philosophy**: Depending on the Program, students attain a breadth of knowledge across a greater or lesser range of areas and topics, including the history of philosophy, moral, social, and political philosophy, metaphysics and epistemology, philosophy of mind and language, philosophy of science, and logic.
3. **Integrate philosophical skills and philosophical knowledge**: Students develop competencies that are useful in non-philosophical contexts and domains, e.g.: clarity and well-orderedness in thought and communication, awareness of the limits of knowledge of philosophical questions, strategies for tackling problem-solving challenges.

b) Discuss the consistency of the program's objectives with the institution's mission and U of T's/the division's/unit's academic plans, priorities and commitments, including consistency with any implementation plans developed following a previous review

The Logic Minor supports the University's Statement of Institutional Purpose: and in particular the University's Mission Statement: "The University of Toronto is committed to being an internationally significant research university, with undergraduate, graduate and professional programs of excellent quality." It further supports the University's commitment to teaching, specifically its commitment to: "Responding to the needs of a diverse student population." The Minor in Logic is a program that will attract strong students who are interested in foundational elements of mathematics, computer science, and statistics, and meets the need occasioned by the strong interest in logic as attested to by strong enrolments.

The Logic Minor supports key elements of UTM's Academic Plan, including:

Goal 1: Inspire student success by supporting a rigorous and innovative academic environment

- The program will capitalize on students' interest in formal issues and introduce students to formal approaches to philosophical topics. Students experience how formal rigour affects our understanding of a topic by allowing new and sharper questions to be asked.

Students will learn how formalism and formalization can be used as a tool for innovation.

Goal 2: Demonstrate that UTM is a home for world-class research

- The program will appeal to some of the strongest students at UTM. The program investigates abstract structures such as formal languages, different logics, and models for reasoning and decision. Students will access areas of study and faculty expertise appropriate for a world-class research university.

Goal 4: Educate future leaders to be global citizens meeting global challenges

- The program attracts students with formal interests exercised in mathematical, computational scientific, and statistical courses and develops them in philosophical directions. Students round out their formal training with the larger more speculative and exploratory perspectives of philosophy appropriate for developing into global citizens with a concern for global challenges.

UTM Philosophy conceives of the Minor as a core component for its plan for the pursuit of its overall learning objectives. The plan for a Minor was also reported in the 2019 UTQAP Cyclical Review Final Assessment Report and Implementation Plan.

Logic is a foundational part of philosophy. Philosophers think and reason about and construct arguments for philosophical positions. It is not possible to do any of these things well without an understanding of when a thought, a chain of reasoning, or an argument for some position is logically in good order. All of the courses offered by UTM Philosophy touch, to varying degrees, on logical questions like these. Logic, understood as a philosophical discipline, is the focused study of the various dimensions of these questions.

c) Appropriateness of degree or diploma nomenclature given the program's objectives.

The proposed program is an Arts-focused Minor. This is appropriate since it is intended to provide students with foundational knowledge in the discipline of logic. Logic is a sub-discipline of Philosophy which, as a Humanities discipline, typically leads to an Honours Bachelor of Arts.

Academic Rationale

- In a **single** response, please describe the academic rationale for the proposed changes, referring to the calendar copy above, and considering the changes relative to the criteria below.

a) Provide a statement on the way in which the proposed major modification will **improve the student experience**.

Logic, in the broadest sense, is the study of good (e.g., formally valid or strong) reasoning, inference, and argumentation. UTM students from many academic backgrounds and disciplines are increasingly attracted to the formal study of Logic. This is evidenced by strong enrolments in our PHL245H5 course (average 190 students per section), as well as in PHL246H5 (average 90 students per section), with many non-program students taking these courses as electives. Logic serves to sharpen clarity, rigor, precision, and understanding and evaluating reasoning. The proposed Minor in Logic will respond to and capitalize on the heightened degree of interest, and ensure graduates achieve the program objectives, identified above.

Familiarity with good reasoning, inference, and argumentation is a crucial component of almost any academic endeavour, and it is also a crucial part of being a responsible member of a democratic society. Students who complete the proposed Minor will acquire skills enabling them to think critically and carefully about novel problems they confront, to apply logical concepts and methods to investigating these problems, and to rigorously evaluate alternative solutions that might be proposed to them. These are skills with a wide range of potential uses and applications, acquisition of which will contribute to students' preparedness for a wide range of high-level intellectual endeavours, advanced coursework within and outside of the Humanities, postgraduate study, and careers that prize strong abilities in reasoning, inference, and argumentation.

Any rigorous academic offering at the university-level can be expected to impart some degree of knowledge of good reasoning, inference, and argumentation. Courses in logic are, however, academically unique in their focus on developing this kind of knowledge, in all its major dimensions, in students. This focus has especially significant resonance with mathematics, computer science, and statistics, and so the Minor includes a requirement to complete 1.0 credits (typically two half courses) from these disciplines. The proposed Minor is targeted to students of any academic discipline who are seeking an academic track that will develop this kind of focused knowledge, whether for its own sake, or for the sake of application in their academic work in their "home" discipline.

b) **Evidence that the following have been substantially considered** in the context of developing the proposed change and its associated resources:

1. Universal design principles and/or the potential need to provide mental or physical disability-related accommodations, reflecting the University's *Statement of Commitment Regarding Persons with Disabilities*

The Minor in Logic incorporates Universal Design for Learning (UDL) principles to create an optimized and accessible learning environment for all students. This framework is utilized to ensure that course content, teaching methodologies, and assessment strategies are designed to accommodate diverse learning needs while maintaining academic rigor and program integrity. The implementation of UDL principles and the University's commitment to persons with disabilities is addressed in the following ways.

- Special Accessibility Academic Advising – students may book accessibility appointments for addressing students' accessibility needs, accommodation planning, and support services coordination.
- Inclusive learning practices such as choice in assignment formats; flexible deadline options for assignments; multiple assignment opportunities, etc.
- Students will be provided with multiple opportunities to share their experiences through anonymous surveys and individual check-ins, ensuring multiple communication channels for expressing both challenges and successes. This ongoing feedback enables the department, faculty, and staff to make real-time adjustments to course delivery, support services, and the program as a whole.

In addition, UTM Philosophy will discuss at faculty meetings issues around accessibility and disability, and may invite RGASC Education Developer for Accessibility and UDL to visit during a faculty meeting.

2. Support for student well-being and sense of community in the learning and teaching environment, reflecting the work of the Expert Panel on Undergraduate Student Educational Experience and the commitment to establishing a Culture of Caring and Excellence as recommended by the Presidential and Provostial Task Force on Student Mental Health

The Program incorporates flexibility in alternative pathways to program completion, upon approval from the Chair or Associate Chair of the department. The Program provides

opportunities for students to demonstrate skills and knowledge in different ways including through formal essay writing, oral presentations, and group projects.

The Logic Lab: The Logic Lab was designed to serve as an essential academic support hub for PHL245H5 students. Beyond academic support, the Logic Lab cultivates a vibrant learning community where students from diverse backgrounds connect through shared work on problem sets and study groups fostering both intellectual growth and lasting connections among philosophy majors and minors and the other students who take Logic.

Leverage the resources and funding provided by UTM Philosophy to the student organization group, the Philosophy Academic Society, for developing community and belonging.

3. Opportunities for removing barriers to access and increasing retention rates for Indigenous students; for integrating Indigenous content into the curriculum in consultation with Indigenous curriculum developers; and for addressing any discipline-specific calls to action, reflecting the commitments made in *Answering the Call: Wecheehetowin: Final Report of the Steering Committee for the University of Toronto Response to the Truth and Reconciliation Commission of Canada*

Proactive Academic Advising will be available for this student population specifically. Program courses will include readings in required and elective courses from underrepresented communities where possible and appropriate. In addition, program courses will actively incorporate, where possible and appropriate, works by Indigenous philosophers into core curriculum courses rather than only in specialty courses, ensuring Indigenous students see their intellectual traditions and perspectives represented in foundational philosophical discussions throughout the program's content. Finally, program courses will contextualize western philosophy within a larger global philosophical environment where this is possible and appropriate.

4. Opportunities for removing barriers to access and increasing retention rates for Black students; for promoting intersectional Black flourishing, fostering inclusive excellence and enabling mutuality in teaching and learning, reflecting the commitments made in the *Scarborough Charter* and consistent with the recommendations of the *Anti-Black Racism Task Force Final Report*.

Proactive Academic Advising will be available, designed for this student population. Program required and elective courses will include readings from underrepresented communities where possible and appropriate. In addition, program courses will actively incorporate, where possible

and appropriate, works by Black philosophers into core curriculum courses rather than only in specialty courses, ensuring Black students see their intellectual traditions and perspectives represented in foundational philosophical discussions throughout the program's content. Finally, program courses will contextualize western philosophy within a larger global philosophical environment in courses where this is possible and appropriate.

5. Opportunities for fostering an equitable, diverse, and inclusive teaching and learning environment, reflecting the values articulated in existing institutional documents such as the *Statement on Equity, Diversity, and Excellence*, the *Antisemitism Working Group Final Report*, the aforementioned reports, and future institutional reports related to equity, diversity and inclusion.

UTM Philosophy continues to support the Canadian Philosophical Association's summer program for under-represented students: five out of the program's fifteen students in 2023 were Black. We also organized program talks by Black philosophers, such as former U of T graduates Professor Charles Mills (formerly CUNY, now deceased) and Professor Chike Jeffers (Dalhousie) which created opportunities for Black philosophy students to meet and connect. We have as well collaborated with OVPR to fund postdoctoral fellowships in philosophy. UTM Philosophy has also been expanding Ontario's High School Ethics Bowl to focus more intentionally on encouraging participation from underrepresented communities in philosophy.

c) Where appropriate, discuss **unique curriculum or program innovations, creative components, significant high impact practices** relative to the change proposed.

The Logic Minor provides opportunities for experiential learning in the form of Teaching Assistant work in the Logic Lab, where strong undergraduate students provide drop-in support for our large PHL245H5 course.

5. Program Requirements and Structure Admission Requirements

- Please describe any proposed changes to admission requirements by considering the changes relative to the following:

a) Discuss the appropriateness of the program's admission requirements as they are articulated in section 3 above, given the program's objectives and program-level learning outcomes.
b) Provide a sufficient explanation of alternative requirements, if applicable, for admission into a graduate, second-entry or undergraduate program; e.g., minimum grade point average, additional languages or portfolios, and how the program recognizes prior work or learning experience.

The proposed Minor will have unlimited enrolment; students will be able to select the Minor as a Subject POSt following the completion of 4.0 credits.

All Programs

In a **single** response, please discuss any proposed changes or new program requirements, including any changes to milestone assessments, if applicable, by considering the changes relative to the following criteria:

a) With reference to the change proposed, **discuss the appropriateness of the offering's structure and the requirements to meet its objectives and program-level learning** outcomes, including the structure and requirements of any identified streams (undergraduate), fields or concentrations (graduate).

b) Appropriateness of the offering's structure, requirements and program-level learning outcomes in meeting the institution's applicable undergraduate or graduate Degree Level Expectations.

c) **Appropriateness and effectiveness of the mode(s) of delivery** (i.e., means or medium used in delivering a program; e.g., lecture format, distance, online, synchronous/asynchronous, problem-based, compressed part-time, flex-time, multi-campus, inter-institutional collaboration or other non-standard forms of delivery) to facilitate students' successful completion of the program-level learning outcomes.

1. If the offering's structure will be an online or hybrid mode of delivery, please discuss the following as appropriate:
    1. Maintenance of and/or changes to the program objectives and program-level
    2. Learning outcomes

3. Adequacy of the technological platform and tools
4. Sufficiency of support services and training for teaching staff
5. Sufficiency and type of support for students in the new learning environment
6. Access

d) Discuss the ways in which the curriculum addresses the current state of the discipline or area of study and is appropriate for the level of the program.
e) Please provide details on any experiential learning that is part of the offering, including confirmed and interested partners, duration of experiential learning component in a program, and anticipated number of placements.

The Logic Minor will consist of 4.0 credits such that: 1.0 credits will be from 200-level introductory Philosophy (PHL) logic courses; 1.0 credits will be from 300-level or 400-level PHL logic courses; 0.5 credits will be from PHL courses that are related to logic but not technical in nature; 1.0 credits will be from courses offered by the Department of Mathematical and Computational Sciences (MCS); and the final 0.5 credit will be a flexible credit from any of the above requirements.

The Program Objectives (POs), as presented in section 4, are:

(PO1) Proficiency in critical, rigorous evaluation of inferences and arguments, across a range of contexts.
(PO2) Proficiency in symbolic reasoning and understanding of symbolic systems and their properties.
(PO3) Understanding of logic as a discipline: an understanding of the philosophical issues that arise in the study of logic, the history and development of the discipline, and its relationship to cognate areas of mathematics, computer science, and statistics.

The Program-Level Learning Outcomes (PLOs) are:
Upon successful completion of the program, graduates will possess the ability to

(PLO1) Identify and analyze different types of logical inferences and arguments.
(PLO2) Identify common fallacies of reasoning.
(PLO3) Analyze inferences and arguments at a high level of abstraction.
(PLO4) Construct and evaluate proofs in symbolic logical systems.

(PLO5) Apply logical knowledge to philosophical problems and problem-solving in mathematics and computer programming.
(PLO6) Follow and evaluate sophisticated logical and mathematical proofs.

The requirements and structure of the Logic Minor support the POs and PLOs above. Students will be required to complete two out of three 200-level introductory logic courses (i.e., two of: PHL239H5, PHL245H5, and PHL246H5). These courses provide the foundation to the logic of critical reasoning, deductive logic, and inductive logic respectively. This requirement ensures that students who complete the Logic Minor have been introduced to at least two branches of logic, with at least one of them being formal in nature.

Students will also complete at least two courses at the 300-level or 400-level in logic. PHL345H5 is a continuation of the deductive logic learned in PHL245H5; PHL346H5 is a continuation of the inductive logic learned in PHL246H5; and PHL347H5 teaches modal logic, for which PHL245H5 is a prerequisite. Our 400-level course topics vary between these three branches of formal logic: deductive, inductive, and modal.

Upon completion of these requirements, students will have obtained (PLO1), (PLO2), (PLO3), (PLO4), and (PLO6). They will have a strong competency in formal logical systems and techniques that would be sufficient for studying logic in a philosophy graduate program. In this way, the requirements of the Logic Minor support (PO1) and (PO2)—the ability to evaluate arguments and inferences in a symbolic language is the core of this program.

Students will complete 0.5 credits from a selection of PHL courses that are related to logic but not technical in nature (PHL103H5 or PHL233H5 or PHL258H5 or PHL325H5 or PHL327H5 or PHL332H5 or PHL350H5 or PHL354H5 or PHL450H5). See appendix A for a description of these courses. An important feature of these courses is that they are not purely technical in nature. They require the reading of philosophy and deliverables based on understanding this material. Another important feature is that the philosophy taught in these courses makes use of arguments that are logical in nature, and sometimes even rely on foundational results in mathematics. This means that students who have a good understanding of formal logic will be able to apply their abstract skills of argument analysis in other settings by being able to analyze and understand complex philosophical arguments or technical results. This requirement of the Logic Minor thus supports (PLO5) and (PLO6). (PO1) and (PO3) are also met by this requirement in conjunction with the core logic requirements above.

(PLO5) and (PLO6) relate to the application of logic and how competency in logic facilitates the understanding of more complex logical and mathematical results. While these are supported in the above requirement of PHL courses that are related to logic, they are also supported in the requirement to take 1.0 credits of courses offered by MCS.

The final 0.5 credit requirement of the Logic Minor can be achieved by taking a course that satisfies any of the above requirements. This gives students in the Logic Minor flexibility in how they choose to round out their logic education in order complement their other program(s) of study. They could choose to focus on technical logic and take another PHL course in formal logic; they could choose to focus more on application and take another reading and writing PHL course where their logical knowledge will help them understand that material; or they could choose to take more MCS courses where they can apply their knowledge of logic into computer coding or mathematical proofs.

Scaffolding in the program is supported by the pre-requisite structure of the PHL courses; specifically, 300-level courses have 200-level pre-requisites, and 400-level courses have 300-level pre-requisites. All of the 300-level courses in the second requirement (1.0 credits will be from 300-level or 400-level PHL logic courses) have a prerequisite from our core 200-level logic courses, which are all included in the first requirement of the Logic Minor, and all of the 400-level courses have a prerequisite from our 300-level logic courses. There is thus a natural progression to achieve the formal logical competency outcomes of the program: (PO1), (PO2), (PLO1), (PLO2), (PLO3), and (PLO4).

The remaining requirements can be attained in any order. A primary reason for this flexibility in the structure of the program is that there are several plausible routes through which students would learn about logic and subsequently enroll in the Logic Minor. One route is through encountering logic as a discipline in one of the introductory PHL courses (such as PHL103H5, PHL113H5, PHL233H5, or PHL258H5). These courses are important gateways for students to learn about logic and lead them to the formal courses on logic. Another route involves students taking a course on formal logic (PHL239H5, PHL245H5, or PHL246H5) as their first PHL course, and their experience in one of these courses leads them to take more PHL courses. This is a very likely path as these 200-level PHL courses have experienced historically high enrolments with many of the enrolled students coming from programs outside of PHL, especially from programs offered by MCS. Another likely route involves students in MCS programs taking one of the introductory logic courses as a humanities degree requirement, and their experience drawing them into the Logic Minor. For example, PHL239H5 is listed on the UTM Distribution Requirement website as a suggested Humanities course, and PHL245H5 and PHL246H5 are also

extremely popular distribution requirement courses. Given the many plausible paths that one can be drawn to the Logic Minor, the flexibility of the structure of the program supports (PO3) and the attainment of (PLO5) and (PLO6) for all program students.

The Logic Minor includes courses from MCS and is thus interdisciplinary in nature. The connection is organic, not artificial. CSC236H5 Introduction to the Theory of Computation, for example, covers mathematical induction (a logically deductive proof technique), proof correctness, and formal languages. CSC301H5 Introduction to Software Engineering includes software development which uses strong logical background. CSC324H5 Principles of Programming Languages is a course that requires understanding of fundamental logical concepts and rules. There are several Math courses that require the use of symbolic logic and its rules (e.g., MAT102H5 Introduction to Mathematical Proofs, MAT137H5 Differential Calculus for Mathematical Sciences, MAT139H5 Integral Calculus for Mathematical Sciences, MAT202H5 Introduction to Discrete Mathematics, MAT301H5 Groups and Symmetries, and MAT401H5 Polynomial Equations and Fields). While many MCS courses make use of formal logical skills, the very foundation of logical systems is the domain of philosophy. The majority of MCS students are not aware of this fact and exposing them to the Logic Minor facilitates a robust development of logical skills from more than one perspective. Students in the Logic Minor will learn to apply formal logical reasoning in both technical settings from MCS courses as well as critical reasoning settings from PHL courses. This type of interdisciplinary satisfies a need to add learning dimensions to the student experience.

The structure and requirements of the Logic Minor are designed to support the three POs and to facilitate graduates of the program in their attainment of the six PLOs. In turn, the six PLOs are appropriate for meeting four of the six Undergraduate Degree Level Expectations (DLEs):

Degree Level Expectation	**Program Learning Outcomes**
1. Depth and Breadth of Knowledge *Breadth of Knowledge:* In the course of their studies, students will gain an awareness and appreciation of the variety of modes of thinking, methods of inquiry and analysis, and ways of understanding the world that underpin different intellectual fields. Students will engage in critical thinking and analytical skills – including with respect to equity,	Breadth of knowledge is understood in the Minor as knowledge of a range of logical systems, their applications in philosophy and other disciplinary contexts, and their philosophical and formal significance. Depth of knowledge is understood in the Minor as knowledge of the core principles underlying the very idea of logic and different

diversity, and inclusion – through courses within and beyond their core field(s) of study, across the humanities, the social and behavioural sciences, and the natural sciences. *Depth of Knowledge:* Students will attain depth of knowledge in their core field(s) of study through a progression of introductory, core, and specialized courses.	logics and their applications in philosophy and other disciplinary contexts. These teaching goals are reflected in program learning outcomes. Students will be able to: (PLO1) Identify and analyze different types of logical inferences and arguments. (PLO2) Identify common fallacies of reasoning. (PLO3) Analyze inferences and arguments at a high level of abstraction.
2. Knowledge of Methodologies Students will have knowledge of and experience with different methodologies and approaches relevant to their core field(s) of study.	Knowledge of methodologies is understood in the Minor as knowledge of the differences between different logical systems and their different applications in philosophy and other disciplinary contexts. Students will be able to: (PLO1) Identify and analyze different types of logical inferences and arguments. (PLO2) Identify common fallacies of reasoning. (PLO3) Analyze inferences and arguments at a high level of abstraction.
3. Application of Knowledge Students will be able to frame relevant questions for further inquiry within or beyond the core field(s) of study. They will be able to identify and apply the appropriate tools with which they can address such questions effectively. This includes a knowledge of how	Application of knowledge in the Minor is understood as knowledge of how to apply formal logic techniques to argument analysis, proof construction, reasoning, and critical thinking in philosophy and other disciplinary contexts.

historical and present discrimination (including, but not limited to, discrimination on the basis of race, religion, sexuality, gender, and ability) affect these questions, problems, and solutions.	Students will be able to: (PLO4) Construct and evaluate proofs in symbolic logical systems. (PLO5) Apply logical knowledge to philosophical problems and problem-solving in mathematics and computer programming. (PLO6) Follow and evaluate sophisticated logical and mathematical proofs.
4. Communication Skills Students will be able to effectively communicate and critically evaluate information, arguments, and analyses, using a range of modes of communication.	Communication skills in the Minor are understood as skills in expressing complex ideas clearly and precisely, both symbolically and linguistically. Students will become more effective at debating, academic writing, and discussions. Students will be able to: (PLO4) Construct and evaluate proofs in symbolic logical systems. (PLO5) Apply logical knowledge to philosophical problems and problem-solving in mathematics and computer programming. (PLO6) Follow and evaluate sophisticated logical and mathematical proofs.
5. Awareness of Limits of Knowledge Students will acknowledge and appreciate the limits of their own knowledge. They will also gain an awareness of the uncertainty, ambiguity, and limits of our collective knowledge and how these might influence analyses and interpretations.	N/A – this DLE is not supported by the proposed program.

6. Autonomy and Professional Capacity Students will acquire the skills, knowledge, and critical problem solving they need to become informed, ethical, inclusive, independent, and creative thinkers and decision-makers; gain an awareness and appreciation that knowledge and its applications are influenced by and contribute to society as a whole; and lay the foundation for learning as a life-long endeavour.	N/A – this DLE is not supported by the proposed program.

(DLE1) and (DLE2) are directly supported by (PLO1), (PLO2), and (PLO3). These PLOs ensure that graduates will have competency in multiple systems of logic, the ability to analyze inferences and arguments critically, and to identify logical fallacies. The development of critical thinking and reasoning skills is central to the Logic Minor program.

(DLE3) and (DLE4) are supported indirectly by (PLO4), (PLO5) and (PLO6). The logical competency attained in this program will certainly be applicable in other core courses int MCS and PHL. More generally, logical reasoning is applicable everywhere and the critical reasoning skills acquired will help students in all of their studies. This includes their written and oral communication when tasked with analyzing or formulating arguments.

The Logic Minor is not designed to develop students' awareness of limits of knowledge or their autonomy and professional capacity, and thus the program does not support (DLE5) or (DLE6).

6. Assessment

a) Discuss the appropriateness of the methods for assessing student achievement of the program-level learning outcomes and degree level expectations.

b) Discuss the appropriateness of the plans to monitor and assess the following:

- The overall quality of the offering's structure

- Whether the program and/or the offering within the program is achieving in practice its proposed objectives
- Whether its students are achieving the program-level learning outcomes
- How the resulting information will be documented and subsequently used to inform continuous program improvement.

Students who satisfy the first two requirements of the Logic Minor will complete four PHL courses in logic, two of which will be from upper-level courses. Assessments in these courses are typically problem set and test based. These methods are ideal for assessing the mastery of technical ability, which constitute the core of (PLO1), (PLO2), (PLO3), (PLO4), and (PLO6).

The third requirement is 0.5 credits from PHL courses that are related to logic but not technical in nature. Assessing student achievement in these courses will vary, but assessments typically include writing-based assignments such as essays. This is an appropriate way to assess the ability of students to apply their logical skills, which is the core of (PLO5).

The requirement of 1.0 credits from Mathematics, Statistics, and Computer Science courses relies on the assessment methods of those courses. It is reasonable to assume that an important learning outcome in MAT and STA courses is the attainment of problem-solving skills in mathematics and the ability to understand mathematical proofs. It is also reasonable to assume that a critical CSC leaning outcome is the ability to perform and understand computer code and programming. As such, regardless of the particular methods of assessment of the MCS courses that a student in the Logic Minor program chooses, they will be assessed appropriately for (PLO5) and (PLO6).

List of Program-Level Learning Outcomes and Assessments

PLO List	Tests/ Exams	Written Papers	Assignments
(PLO1) Identify and analyze different types of logical inferences and arguments.	x	x	x
(PLO2) Identify common fallacies of reasoning.	x	x	x
(PLO3) Analyze inferences and arguments at a high level of abstraction.	x	x	x

(PLO4) Construct and evaluate proofs in symbolic logical systems.	x	x	x
(PLO5) Apply logical knowledge to philosophical problems and problem-solving in mathematics and computer programming.	x	x	x
(PLO6) Follow and evaluate sophisticated logical and mathematical proofs.	x	x	x

The department plans to assess the success of the Logic Minor by monitoring enrolment, time to completion, rates of completion, and by conducting surveys of student satisfaction during and upon completion of the program. Most probative, though, will be enrolment in the program. Initial surveys suggest significant interest amongst Mathematics, Computer Science, Statistics, and Physics students, and like any new program, that interest sets a baseline for evaluation of the success of the minor program. Increases in enrolment will suggest that word of mouth about experiences in the program are positive. Relevant as well will be indications of student satisfaction in student opinion surveys, and the department plans to use surveys to gauge satisfaction and respond to student feedback about individual courses. New Dashboard tools, such as Program Retention Dashboard, will be used to gauge success.

7. Need and Demand

- Provide a brief description of the need and demand for the proposed offering, including information on student demand and internal cognate and external comparator programs.

There are two primary reasons why the Logic Minor would be a strong addition to the Philosophy Department's offerings. First, it meets the demand among UTM students and reflects their interest in learning logic. Second, it addresses the need for strong and relevant interdisciplinary offerings for students that enhance and rounds out their learning opportunities.

We believe that the proposed Logic Minor will respond to demand from UTM students. The Department is responding to a growing number of students who, although not in the Humanities, have shown interest in Philosophy. The enrolments in our 200-level logic classes have steadily grown with the majority of that growth coming from students outside the

humanities, and in particular from students in the Department of Mathematics and Computational Sciences (MCS).

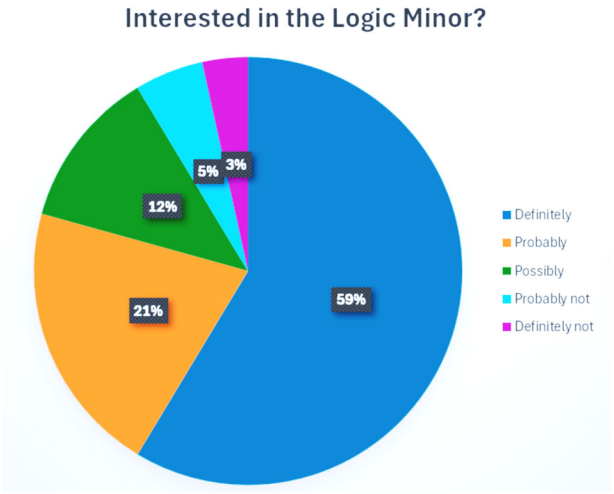
The Minor in Logic is distinct from other programs offered at the University of Toronto, for example, the Specialist in Mathematics and Philosophy, and the Specialist in Physics and Philosophy, offered by the Faculty of Arts and Science (FAS). These Specialist programs, which can only be taken by students who are enrolled in FAS, attract students who are committed to pursuing both mathematics/physics and philosophy at the most advanced levels. The UTM Logic Minor, by contrast, serves UTM students (and only UTM students) who would like to supplement their studies outside philosophy with foundational and larger perspectives on those studies. UTM Philosophy in the past offered a Logic Major, but the last (2019) UTQAP review recommended closing the major and replacing it with a Minor, and this has been in UTM Philosophy plans ever since.

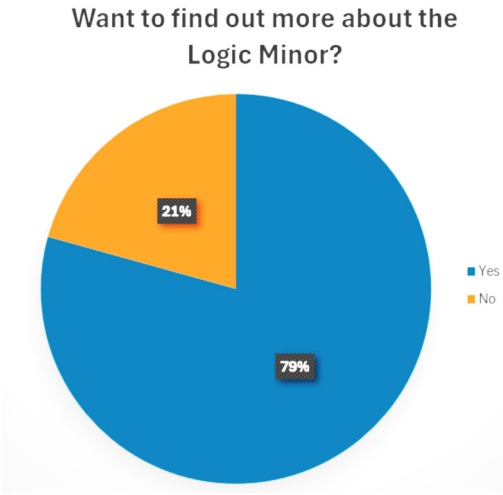
There are few or no Minor programs in Logic in philosophy across Canada. In this sense UTM would be a leader in an important new endeavour to show how philosophy and perhaps even the humanities more broadly can be relevant to not only the physical sciences (in UTM Philosophy, through its Minor in the Philosophy of Science), but also the formal sciences. The proposed Logic Minor allows UTM Philosophy to participate in the enrolment boom that the formal sciences, and especially computer science, are experiencing now and are likely to continue to experience for many years to come, and rounding out students' education in a way that provides foundational and broader perspectives while at the same time developing students writing and communication skills.

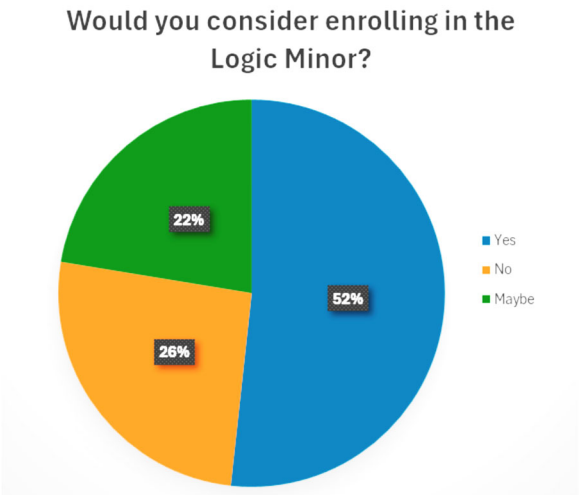
The Minor is particularly targeted to students of academic disciplines that utilize formal tools (e.g., symbolic logic; inductive, probabilistic, or Bayesian inference; decision and rational choice theory) – disciplines including, but not limited to, Mathematics, Statistics, and Computer Science. The Department's proposed Minor responds to a sustained trend of increased enrolment in its logic courses – two courses in deductive logic, and two courses in inductive logic – driven in part by interest from students in Mathematics, Statistics, and Computer Science programs (see Table 1 in Section 7: Need and Demand).

The Department has reached out to the Departments of Mathematical and Computational Sciences (MCS), and Chemical and Physical Sciences in order to gauge student interest in the Logic Minor. Surveys were sent out to all students in the MCS department, the Physics program, and the Philosophy of Science Minor program. A total of 57 students responded, with 46 being MCS students, 8 from the Physics program, and 3 from the Philosophy Minor.

Of these respondents, 34 students (59%) expressed definite interest in the Logic Minor program, 12 (21%) were probably interested, and 7 (12%) were possibly interested. 46 students (79%) wanted more information about the program. 30 students (52%) stated they would seriously consider enrolling if it becomes available, and another 13 students (22%) indicated they might enroll. It is important to note that the surveys included students from first to fourth year and beyond, so many students who expressed interest and wanted more information will not be able to enrol because they have already chosen programs for pursuing their degrees. The results are depicted below.







The overall result from the surveys is that there is strong interest in the Logic Minor. Students want to learn more about the program and many would seriously consider enrolling (52%). In communications about the Logic Minor, we plan to provide information that would address student concerns such as schedule conflicts, course load, and career goals, to encourage enrolment. The department can host information sessions (with Q&A, mini-lectures, and

refreshments) that feature professors participating in the program to encourage further interest. Once the program is up and running, advertising for the program can generate further interest.

With its varied offerings in Logic (and Logic-adjacent areas) and a range of faculty who are experts in Logic (see Section 11), UTM Philosophy is well-placed to capitalize pedagogically on this increased interest, via the proposed freestanding Minor. A freestanding Minor in Logic will generate a stream of students from the Department's burgeoning introductory logic courses into the Department's intermediate and advanced courses (and cognate courses in Mathematics, Computer Science, and Statistics), where they will build on and extend the logical knowledge they've acquired in those courses. Because there are a variety of ways to "do" logic (and so a variety of ways to complete the proposed freestanding Minor), the Minor will be attractive to and intellectually beneficial for students who are interested in Logic for a wide range of possible reasons. For example, students of a statistical inclination may focus their coursework within the Minor on the logic of inductive/Bayesian inference; students of a "pure" mathematical inclination may focus their coursework within the Minor on deductive logic and its metatheory; students of a philosophical inclination may focus their coursework on the philosophy of logic and the role of logic in the history of philosophy. Regardless of their particular track, students who complete the Minor will benefit by acquiring detailed knowledge of (some core aspect of) the theory of good reasoning, inference, and argumentation.

Table 1: Introductory Logic Curriculum

	2018-2019	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**
PHL239H5 Critical Reasoning	n/a	n/a	336	277	257	353
PHL245H5 Modern Symbolic Logic	679	785	872	807	457	587
PHL246H5 Probability and Inductive Logic	285	326	348	248	159	130
Total	964	1111	1556	1332	873	1070

Data source: Power BI, Query 015 Course Enrollment Counts for Specific UTM Courses (accessed November 6, 2024)

While there was a drop in total enrolment numbers in the 2022-23 year, this was not unique to 200-level logic courses in the Philosophy Department. We are optimistic that our numbers will increase and return to pre-pandemic levels within the next several years.

Given the enrolment numbers in 200-level logic courses, it is clear that there is a strong demand for learning logic. The introduction of a formal structure for students makes it

immediately clear how they can continue their education in logic and will address the student demand in learning logic. We feel that there is a demand for this continuation based on anecdotal evidence and survey data. Every year there are always students who complete one of our 200-level logic courses who ask: what is the best way to learn more logic? These students are typically MCS students who are not already familiar with the Philosophy Department's offerings. These informal interactions have resulted in many MCS students taking some upper-year logic courses out of sheer personal interest and points to a steady source of demand for a formal program. Please see section 12: Consultation for more.

There are many other benefits that the Logic Minor program provides. MCS is a large discipline, and their graduates often compete with each other and those from other institutions for jobs or graduate student positions. One way for MCS students to differentiate themselves from others is to have a Minor from a Humanities department. This signals to prospective employers or schools that they have competence in more than just technical work. Having a Logic Minor from Philosophy will indicate that the student has developed critical thinking skills at a more fundamental level and is a well-rounded candidate.

A concrete example of this is in the expanding field of artificial intelligence. Cutting edge technology such as generative AI has proven to be an incredibly complex field that involves many disciplines, including philosophy. The Logic Minor will be a valuable opportunity to develop applicable skills and to demonstrate competency in this field. More traditionally, students who study logic in their undergraduate degree tend to go on to pursue careers in law, journalism, business, software development, engineering, and academia.

8. Enrolment

a) Please provide details regarding the anticipated in-take by year, reflecting the expected increases to reach steady state. Include approximate domestic/international mix. This table should reflect normal estimated program length. (Please adjust the table as necessary.)
b) Please provide an explanation of the numbers shown and their relationship to the Faculty/division's enrolment plan. Please be specific where this may differ from approved enrolment plans.

The Philosophy Department has two relevant minors for comparison: Philosophy of Science, and Ethics, Law and Society. Table 2 provides the enrolment data for the first five years of these minor programs. The steady state value is approximated based off of enrolment numbers from

the past three years, where enrolment numbers in both minor programs appear to have levelled off. All programs have shown growth, ranging from approximately 20% to 85%.

Table 2: Program Enrolment Headcounts Fall 2018 to 2024

	Philosophy Minor	Philosophy of Science Minor	Ethics Minor
2018	239	45	286
2019	311	60	346
2020	299	78	403
2021	296	79	475
2022	270	83	490
2023	270	82	483
2024	282	79	528

Source: Institutional Reporting & Analytics (accessed April 14, 2025)

We project that enrolment in the Logic Minor will sit somewhere in between the Philosophy of Science Minor and the Ethics, Law and Society Minor. The core logic courses have much larger enrolments than the core philosophy of science courses, which means a larger student pool to draw into the Logic Minor (please see Table 1 in Section 7.1).

Table 3: Enrolment Projections

Given the strong enrolment in our 200-level logic courses, we believe a conservative estimate of enrolment in the Logic Minor to be as follows. The estimates about domestic and international students make the following assumptions:

- UTM average domestic enrolment (over past 3 years): ~73%
- Computer Science average domestic enrolment (over past 3 years): ~77%
- Estimated projection for this program: 75% domestic, 25% international

Year of Study	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32
Year 1	-	-	-	-	-	-	-
Year 2	20 15 Dom; 5 Intl	35 26 Dom; 9 Intl	50 38 Dom; 12 Intl	60 45 Dom; 15 Intl	70 53 Dom; 17 Intl	75 56 Dom; 19 Intl	85 64 Dom; 21 Intl
Year 3		15 12 Dom; 3 Intl	30 23 Dom; 7 Intl	45 11 Dom; 33 Intl	55 42 Dom; 13 Intl	65 48 Dom; 17 Intl	70 51 Dom; 19 Intl

Year 4			10 8 Dom; 2 Intl	25 18 Dom; 7 Intl	40 20 Dom; 10 Intl	50 37 Dom; 13 Intl	60 45 Dom; 15 Intl
Total	20 15 Dom; 5 Intl	50 37 Dom; 13 Intl	90 68 Dom; 22 Intl	130 98 Dom; 32 Intl	165 124 Dom; 41 Intl	190 143 Dom; 47 Intl	215 162 Dom; 53 Intl

The Logic Minor is expected to attract primarily existing rather than new UTM students, since there is no planned enrolment growth at UTM, although it is possible that it attracts students who would not otherwise have attended UTM since it looks to be one of the only programs of its kind in Canada. The program has the prospects of drawing students from MCS, but the program has the strong support of the MCS Chair, Ilia Binder, and acts more (by intention) as an outlet for the overflowing MCS enrolments rather than compromising the aims or plans of any MCS program.

9. Impact of the Change on Students and Units

a) Please assess the impact the proposed modification will have on the program's students and/or other units or divisions.

The primary impact of the creation of the Logic Minor program for continuing students will be to provide an additional option for students who are interested in a Minor in Philosophy. In-progress students may opt into the new structure.

The Department will communicate details of the Logic Minor in a variety of ways. We will showcase the program at our Orientations, departmental Meet and Greets, and our undergraduate Philosophy Academic Society events. We are also in the process of improving our social media profile and will use those platforms to advertise the Minor. Finally, we will create an information sheet for our logic instructors to share in their classes.

We will track the implementation of the Logic Minor in several ways. We will monitor the standard metrics, such as program enrolments, retention, course enrolments, etc., using all available means including the new Program Admissions Dashboard. We will create student surveys for students enrolled in the core 200-level logic courses as well as those enrolled in the Logic Minor program for feedback on the program. This tracking will be handled centrally in the Philosophy Department.

10. Resources

Faculty

The department has several faculty members in the tenure stream who are experts in Logic, and the Department includes a faculty member in the teaching stream who specializes in Logic. We offer a series of Logic-related courses so that students in this minor have a variety to choose from.

Table 4: Faculty Complement (please list alphabetically)

Name	**Unit of Primary Budgetary Appt and %**	**Unit of Other Budgetary Appt and % (if applicable)**	**Graduate Faculty Membership Status** (e.g., Associate/ Full privileges)	**Commitment to Other Programs** (Please list other programs in which the person routinely teaches/ supervises.)	**Nature of Contribution to This Program** (Course instructor [CI], thesis supervision [TS], clinical or practice supervisor [C/PS]. Please list the courses each member will teach.)
Tenure Stream: Full					
Nagel, Jennifer	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist, Major, Minor, Phil Sci Minor	CI [**PHL103H5**]
Rattan, Gurpreet	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist, Major, Minor, Ethics Minor	CI [**PHL325H5**, **PHL327H5**]
Yi, Byeong-uk	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist,	CI [**PHL332H5, PHL345H5,**

				Major, Minor, Phil Sci Minor	**PHL346H5, PHL347H5, PHL350H5 PHL445H5, PHL447H5**]
Tenure Stream: Associate					
Charlow, Nate	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist, Major, Minor, Phil Sci Minor	CI [**PHL246H5, PHL258H5 PHL345H5, PHL347H5 PHL350H5, PHL447H5, PHL450H5**]
Das, Nilanjan	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist, Major, Minor, Phil Sci Minor	CI [**PHL350H5, PHL346H5, PHL347H5**
Weisberg, Jonathan	PHL (100%)	n/a	Full, UTM Philosophy	Philosophy Specialist, Major, Minor, Phil Sci Minor	CI [**PHL246H5, PHL347H5, PHL447H5**]
Tenure Stream: Assistant					
N/A					
Teaching Stream: Full					
N/A					
Teaching Stream: Associate					
N/A					
Teaching Stream: Assistant					
Koo, Alex	PHL (43% UTM Philosophy)	57% FAS Philosophy	None	Philosophy Specialist, Major, Minor, Phil Sci Minor	CI [**PHL245H5**]
Non-Tenure Stream (i.e., CLTA)					
Sessional Lecturer					

N/A					
Others (please specify, i.e., adjunct, status only, clinical faculty, visiting or other as per U of T definitions)					
Dunford, Lu-Vada (Part-time Assistant Professor, Teaching Stream, LTA)	PHL (75%)	n/a	none	n/a	CI [**PHL239H5]**

Resources: All Programs

- Given the offering's planned/anticipated class sizes and cohorts as well as its program level learning outcomes please discuss:

a) Participation of a sufficient number and quality of core (i.e. appointed) faculty who are competent to teach and/or supervise in and achieve the goals of the offering and foster the appropriate academic environment.

UTM Philosophy currently has three Full Professors (Tenure-Stream), three Associate Professors (Tenure-Stream), one Assistant Professor (Teaching-Stream), and one Part-time Assistant Professor (LTA, Teaching-Stream) who cover teaching duties for the PHL courses that comprise the proposed freestanding minor. These faculty are ideal to support the program because they are experts in their relevant areas and already teach the courses that are required in the program. The Logic Minor thus does not put any extra workload strain on faculty. The faculty are a mix of senior, mid-level, and junior people to ensure that the courses relevant for the program can be taught in the case of leaves and secondments. Faculty from MCS support the program by providing both the formal skills to engage with logical symbolism and content that is implicitly full of logical content, in the form of symbolism in the statement of theorems and results and precise reasoning and the use of definitions in proofs of these theorems and results.

Teaching-Stream faculty (Koo, Dunford) are generally responsible for teaching PHL239H5 (Critical Reasoning) and PHL245H5 (Modern Symbolic Logic), our large second year courses in logic.

The remainder of the PHL courses that comprise the core of the Minor are generally taught by tenured faculty. (Faculty that are competent to teach courses are indicated parenthetically. In all cases, but one, multiple tenured faculty are able to cover teaching needs in any of the PHL courses that comprise the core of the minor.)

PHL246H5 (Probability and Inductive Logic) – Weisberg, Charlow (Das)
PHL345H5 (Intermediate Logic) – Charlow, Yi
PHL346H5 (Choice and Chance) – Weisberg, Yi (Das)
PHL347H5 (Modality in Logic and Philosophy) – Yi (Charlow)
PHL445H5 (Metalogic) – Yi
PHL447H5 (Seminar in the Philosophy of Logic) – Charlow, Yi (Das, Rattan, Weisberg)

All tenured faculty mentioned here are research leaders in their areas of academic expertise. Nate Charlow is an expert on the language of directives and imperatival logic, and in philosophy of language more generally. Das and Weisberg are experts in formal epistemology. Nagel is an expert in philosophical issues related to AI. Rattan and Yi are experts in the history of analytic philosophy and the philosophy of language.

Faculty in MCS will support the program by conducting their classes in the usual way and providing the material content in which logical structure and patterns of reasoning studied in the Logic Minor are found and in which logical knowledge is applied.

b) If applicable, discuss the role and approximate percentage of adjunct and sessional faculty/limited term appointments used in the delivery of the offering and the associated plans to ensure the sustainability of the offering and quality of the student experience.

Adjunct/sessional instruction plays a minimal role in the delivery of PHL courses that comprise the core of the minor.

c) If required, provision of supervision of experiential learning opportunities.

Not Applicable

d) Adequacy of the administrative unit's planned utilization of existing human, physical and financial resources.

The Minor is composed of existing courses and there will be no additional space or infrastructure requirements. Given the projected enrolment, the growth in course registrations should be accommodated by existing classroom assignments and scheduling. If the Minor grows beyond projected enrolments, we will revisit these needs. The Minor should not occasion any new needs with respect to advising and student support services.

e) Evidence that there are adequate resources to sustain the quality of scholarship and research activities produced by students, including library support, information technology support, and laboratory access.

Students in the proposed Minor will have access to all of the academic support services offered by the University of Toronto Mississauga, including student academic advising, library, accommodations, etc.).

The Minor does not require additional resources for space, teaching, equipment or infrastructure.

f) If necessary, additional institutional or divisional resource commitments to support the offering in step with its ongoing implementation.

Not Applicable

11. Consultation

- Describe consultation with internal (faculty, students, cognate units, etc., as appropriate) and external stakeholders (alumni, community, or professional organizations, etc., as appropriate).

The Logic Minor was discussed with UTM faculty as part of the response to the last UTQAP review. In addition, two members of the faculty served to help with writing up the documentation for the Minor. The Chair of MCS was consulted about the Minor and students taking their courses. The MCS Chair is an enthusiastic supporter of the Logic Minor. Both the Vice Dean Faculty and the Vice Dean Undergraduate have also been consulted, and support the Minor. In addition, surveys of students in MCS and Physics in CPS and philosophy students were conducted, with strong support.

Although the Logic Minor is intended to attract students from MCS, the minor itself does not require specific courses from MCS requirements to be completed. Students may apply up to 1.5 credits from outside philosophy for the Logic Minor, at their discretion.

The details of the proposal were communicated to the Tri-Campus Deans (deans from the three University of Toronto undergraduate divisions: FAS, UTM, and UTSC) on March 27, 2025. The UTSC Vice-Dean posed a few thoughtful questions regarding the proposal, including whether there are any limitations to potential combinations of programs within the Philosophy Department (e.g., if students wished to combine this Minor with another program in the department). The UTSC Vice-Dean also highlighted the interdisciplinary strength of requiring a

course in computer science, statistics or mathematical sciences, while noting potential enrolment pressures in these areas and suggesting that, over time, it may be helpful to provide students with guidance on which courses are best aligned with the Minor in Logic. The potential concern about enrolment pressures had been identified during development of the proposal and is not expected to cause issues since the majority of students interested in enrolling in the Logic Minor will be coming from programs in computer science, statistics, and/or mathematical sciences, and therefore would already have access to these courses. With regards to program overlap, there is room for some courses to overlap between these unique programs without jeopardizing the requirement of 12.0 distinct credits for degree completion.

Broader consultation was also undertaken. On March 28, 2025, the proposal was circulated through the Faculty of Arts and Science (FAS) Dean's Office and the UTSC Dean's Office to relevant departments across campuses. At UTSC, it was shared with the Department of Philosophy, the Department of Computer and Mathematical Sciences, and the Department of Physical and Environmental Sciences; no feedback was received from these units. Within FAS, the proposal was sent to the Departments of Philosophy, Computer Science, Mathematics, Statistical Sciences, Physics, and the Cognitive Science Program. The Department of Philosophy provided the following comment: "The FAS Department of Philosophy strongly supports this meritorious proposal. It will not have any negative impact on our enrolments in our logic courses, which are all already at capacity." No other departments provided feedback.

Appendix A: Courses

Below is a list of courses ordered by program requirement number. All courses already exist in the academic calendar.

PHL239H5: Critical Reasoning (Program Requirement 1)
The course covers the area of informal logic--the logic of ordinary language. Topics include: criteria for the critical assessment of arguments as strong or merely persuasive; different types of argument and techniques of refutation; their use and abuse.
Exclusions: (PHL145H5 and PHL247H5) or TRN200Y1
Distribution Requirement: Humanities

PHL245H5: Modern Symbolic Logic (Program Requirement 1)
An introduction to formal deductive logic. Semantics, symbolization, and techniques of natural deduction in sentential logic. Symbolization, natural deduction, and models in monadic predicate logic. Symbolization and natural deduction with polyadic predicates. Introduction to advanced concepts in first-order logic, such as operations, identity, and models.
Exclusions: PHL245H1 and PHLB50H3
Recommended Preparation: PHL103H5 or PHL113H5
Distribution Requirement: Humanities

PHL246H5: Probability and Inductive Logic (Program Requirement 1)
The elements of axiomatic probability theory, and its main interpretations (frequency, logical, subjective). Reasoning with probabilities in decision making and science.
Prerequisites: PHL101H5 or PHL102H5 or PHL103H5 or PHL105Y5 or PHL113H5 or 4.0 credits.
Recommended Preparation: PHL101H5 or PHL102H5 or PHL103H5 or PHL113H5 or PHL105Y5 or PHL245H5
Distribution Requirement: Humanities

PHL345H5: Intermediate Logic (Program Requirement 2)
A continuation of PHL245, requiring no other prior knowledge of philosophy or mathematics. Symbolization, natural deduction, and models in polyadic predicate logic with operations and identity. Symbolization, natural deduction, and models for theories of descriptions. Introduction to metatheory, such as soundness and completeness.
Prerequisites: PHL245H5 and 1.0 credits on PHL
Exclusions: PHL345H1 and PHLC51H3
Distribution Requirement: Humanities

PHL346H5: Choice and Chance (Program Requirement 2)

An intermediate level look at reasoning and decision making in the face of uncertainty. Topics may include: decision theory, game theory, social choice theory, confirmation theory, foundations of probability and statistics, puzzles of infinity and self-location, and the relationship between knowledge and uncertainty.
Prerequisites: 1.5 PHL credits
Recommended Preparation: PHL246H5 or any first course in probability/statistics/decision-making
Distribution Requirement: Humanities

PHL347H5: Modality in Logic and Philosophy (Program Requirement 2)
Study of the concepts of necessity and possibility using extensions of classical logic: modal sentential logic, modal quantification logic, possible-world semantics, the metaphysics of modality. Other possible topics include: counterfactuals, epistemic logic, temporal logic, deontic logic, many-valued logic, and supervaluations.
Prerequisites: PHL245H5 and 1.0 credit in PHL
Exclusions: PHL347H1
Recommended Preparation: PHL345H5
Distribution Requirement: Humanities

PHL445H5: Metalogic (Program Requirement 2)
A continuation of PHL345H5, this is a course in the mathematical study of logic, also known as meta-logic. We will investigate and prove theorems about logical systems. Topics covered will include: basic set theory and recursion theory, completeness, compactness, and the Loewenheim-Skolem theorems for first-order logic, and Gödel's incompleteness theorems.
Prerequisites: (PHL345H5 or MAT309H5) and 1.0 credit in PHL
Exclusions: PHL348H1 and PHL348H5
Distribution Requirement: Humanities

PHL447H5: Seminar in Philosophy of Logic (Program Requirement 2)
Study of advanced topics in logic or the philosophy of logic.
Prerequisites: (PHL345H5 and 3.0 credits of PHL) or by permission of the Instructor or Department.
Exclusions: PHL451H5
Distribution Requirement: Humanities

PHL103H5: Introduction to Philosophy: Knowledge and Reality (Program Requirement 3)
This introductory course takes up philosophical questions about knowledge, reality, language, and the mind. A variety of traditional and contemporary perspectives will be considered. Note: Students may take either or both PHL103H5 and PHL113H5, in any order or simultaneously. The two courses differ only in the philosophical topics they cover.
Exclusions: PHL105Y5 or PHL101H5 or PHL100Y1 or PHL101Y1 or PHL201H1 or PHLA10H3

Distribution Requirement: Humanities

PHL233H5: Philosophy for Scientists (Program Requirement 3)
An introduction to philosophy tailored for students with backgrounds in mathematics and science. Topics include causation, explanation, the relation between scientific and mathematical theories and reality, the role of mathematics in scientific theories, the relevance of scientific and mathematical discoveries to 'big' traditional philosophical questions such as the nature of consciousness, whether we have free will, and the meaning of life.
Prerequisites: PHL103H5 or PHL113H5 or 4.0 credits.
Distribution Requirement: Humanities

PHL258H5: Puzzles and Paradoxes (Program Requirement 3)
Philosophy often begins with a puzzle or paradox. Zeno once convincingly argued that motion was impossible, but people continue to move. The "liar's paradox" seems to show that everything is both true and false, but that cannot be right. In this course, we will examine these and related issues.
Prerequisites: PHL101H5 or PHL102H5 or PHL103H5 or PHL105Y5 or PHL113H5 or 4.0 credits.
Exclusions: PHLB55H3
Recommended Preparation: PHL245H5
Distribution Requirement: Humanities

PHL325H5: Early Analytic Philosophy (Program Requirement 3)
An examination of some of the classic texts of early analytic philosophy, concentrating on the work of Frege, Russell and Wittgenstein. Central topics to be covered include: the development of logic and its relation to arithmetic; the nature of language and meaning; truth and objectivity; the distinction between sense and reference; logical analysis; the relation between language and thought; and the bounds of intelligibility.
Prerequisites: PHL245H5 and 1.5 additional credits in PHL
Exclusions: PHLC43H3
Recommended Preparation: PHL210Y5
Distribution Requirement: Humanities

PHL327H5: Later Analytic Philosophy (Program Requirement 3)
An examination of the later analytic tradition from logical positivism to Kripke. The course will cover some of the following topics: meaning and verifiability; the relation between science and philosophy; ordinary language and philosophy; the nature and status of the analytic-synthetic distinction; meaning and theories of meaning; theories of truth; the nature of necessity; and reference and identity.
Prerequisites: PHL 245H5 and 1.5 additional credits in PHL
Recommended Preparation: PHL325H5
Distribution Requirement: Humanities

PHL332H5: Metaphysics (Program Requirement 3)
Typical topics: ontological categories; ontological commitment; the objectivity of space and time: causality and determinism; mind and body.
Prerequisites: 1.5 credits in PHL
Exclusions: PHL330Y1 or PHL331H1 or PHLC60H3
Distribution Requirement: Humanities

PHL350H5: Philosophy of Language (Program Requirement 3)
Topics may include: Different approaches to the study of language; the analysis of central theoretical notions in the descriptions of language; the relation between thought and language; the relation between philosophy of language and metaphysics.
Prerequisites: PHL245H5 and 1.5 additional credits in PHL
Exclusions: PHL351H1 or PHLC80H3
Distribution Requirement: Humanities

PHL354H5: Philosophy of Mathematics (Program Requirement 3)
Platonism versus nominalism, the relation between logic and mathematics, implications of Godel's and Church's theorems, formalism and intuitionism.
Prerequisites: PHL103H5 and PHL245H5 and (0.5 credit in PHL or CSC or MAT)
Exclusions: PHL344H5 and PHL354H1
Recommended Preparation: PHL255H5
Distribution Requirement: Humanities

PHL360H5: Philosophy of Artificial Intelligence (Program Requirement 3)
This course examines contemporary artificial intelligence from a philosophical perspective. Topics include: the nature of intelligence, comparisons between biological and artificial learning, linguistic understanding and grounding in foundation models, moral guidance for AI systems, and the moral status of artificial agents.
Prerequisites: 1.5 credits in PHL
Distribution Requirement: Humanities

PHL450H5: Seminar in Philosophy of Language (Program Requirement 3)
Study of advanced topics in philosophy of language.
Prerequisites: (PHL245H5 and 3.0 credits of PHL) or by permission of the Instructor or Department.
Exclusions: PHL451H5
Distribution Requirement: Humanities