Master of Climate Risk Assessment and Opportunity
Final Assessment Report & Implementation Plan
April 2024

Faculty / Affiliated University College	Faculty of Engineering
Degrees Offered	MCR
Date of Introduction	September 1, 2024
Fields of Study	Climate Risk and Infrastructure Resiliency Business and Climate Impact Climate Risk and Financial Modelling Climate Change Governance
External Reviewers	Dr. Daniel Scott, Department of Geography and Environmental Management University of Waterloo	Dr. Mathieu Boudreault, Department of Mathematics, Université du Québec à Montréal
Internal Reviewer	Dr. Anabel Quan-Haase, Associate Dean Graduate and Postdoctoral Faculty of Information and Media Studies	Jennifer Guo, PhD Candidate Anatomy and Cell Biology
Date of Site Visit	March 8, 2024
Date Review Report Received	March 20, 2024
Date Program/Faculty Response Received	Program: April 16, 2024 Faculty: April 26, 2024
Evaluation	To be determined by SUPR-G
Approval Dates	SUPR-G: May 13, 2024 ACA: May 29, 2024 Senate: June 7, 2024
Year of Next Review	2031-2032
Progress Report	June 2027

Overview of Western's Cyclical Review Assessment Reporting Process

In accordance with Western's Institutional Quality Assurance Process (IQAP), the Final Assessment Report (FAR) provides a summary of the new program proposal, report prepared by external reviewers, internal responses, and assessment and evaluation of the Master of Climate Risk Assessment and Opportunity to be delivered by the Faculty of Engineering (as host Faculty).

This FAR considers the following documents:
- the program's proposal brief;
- the external reviewers' report;
- the response from the academic unit; and
- the response from the Dean, Faculty of Engineering

This FAR identifies the strengths of the proposed program and opportunities for program enhancement and improvement, and details the recommendations of the external reviewers – noting those recommendations to be prioritized for implementation.

The Implementation Plan details the recommendations from the FAR that have been selected for implementation, identifies who is responsible for approving and acting on the recommendations, specifies any action or follow-up that is required, and defines the timeline for completion.

The FAR (including Implementation Plan) is sent for approval through the Senate Graduate Program Review Committee (SUPR-G), ACA and Senate. Following institutional approval, it is then submitted for approval to the Ontario Universities' Council on Quality Assurance.

Executive Summary

The proposed professional Masters Program provides broad multidisciplinary knowledge related to climate risk and allows learners to develop in-depth knowledge in one of the four areas of specialization (Engineering, Business, Science and Social Science) enabling them to gain discipline-specific expertise in climate risk assessment, adaptation, and mitigation. The proposed Masters Program is a unique offering of part-time and full-time studies in a multidisciplinary climate risk concept which is offered online to target learners of all locations, ages, and stages in their career. The proposed program can be completed via eight courses and a project or work-related learning component to promote the self-paced and specific needs of the individual.

Full-time intake is expected to be five students for 2024-25, working up to 15 in 2029-30. Part-time intake is expected to be 10 students for 2024-25, working up to 25 in 2027-28.

Strengths and Innovative Features Identified by the Program

- Internationally recognized expertise in natural hazards, infrastructure engineering, energy policy, financial risk modeling, urban climate, and public administration.
- Specifically targeting working professionals in diverse areas including engineers, urban planners, climate scientists, data analysts, sociologists, policy makers, financial analysts, business managers, entrepreneurs, etc.
- Collaboration between multiple Faculties (Engineering, Business, Science and Social Science) to create a holistic multidisciplinary program with courses geared towards discipline-specific climate risk topics.
  - Uses a multidisciplinary model showcasing that climate risk is a large problem that needs to be tackled through both interdisciplinary and multidisciplinary methods.
- Offered outside of traditional working hours, mostly asynchronously, to ensure that all learners who want to participate in this program will be able to attend the courses.
- Flexible learning pathway and milestone options that will accommodate a diverse learner population.

Proposal Preparation and Review Process

A team was established to include members of each of the participating Faculties, the Centre for Teaching and Learning, and the faculty members participating in the development of the course content. Termed the Program Development Committee, this group meets as needed to plan and work through all aspects of the Program Development. In support of the initial stages of the committee's work, Leger, a

Canadian market research firm, conducted two surveys to gauge the need of the program from both the students' and employers' perspectives.

Subsequently, in May and June of 2023, the proposed Masters Program was discussed with the:

- Faculty Council of Engineering
- Social Science Graduate Council
- Social Science Chairs
- Relevant programs in the Faculty of Science
- Ivey School of Business, Curriculum and Program Review Committee

Following approval to proceed with an external review, a review committee was struck comprising two external reviewers, one internal reviewer and one student reviewer. Reviewers were provided with the program proposal brief in advance of the scheduled review and then met in-person over one day with the:

- Vice-Provost, The School of Graduate and Postdoctoral Studies
- Associate Vice-Provost, The School of Graduate and Postdoctoral Studies
- Associate Vice-Provost, Academic Planning, Policy & Faculty
- Director of Academic Quality and Enhancement
- Decanal Team (Deans from partnering Faculties)
- Associate Dean Engineering, Research & Graduate
- Climate Risk Program Director
- Program Committee
- Faculty members
- Associate Chief Librarian

Following the site visit, the external reviewers produced a comprehensive external reviewer report with recommendations which was sent to the academic unit and to the Dean of the Faculty of Engineering for review and response. These formative documents, including the new major proposal document, the external reviewer report, and the Program and Faculty responses, have formed the basis of this assessment report of the proposed Master of Climate Risk Assessment and Opportunity (MCR).

Summative Assessment – External Reviewers' Report

External reviewers shared that *"… we found the set of proposed courses very interesting and the applied focus on the types of problems and approaches specific to professions to be an excellent approach to upskilling mid-career as well as those continuing on from an undergraduate program."*

Strengths and/or Unique Aspects of the Program

- Flexibility of an asynchronous/synchronous fully online program will be attractive to mid-career professionals who are the key market segment this program is designed for.
- Applied focus of courses and the types of problems and approaches specific to professions.
- Development of online courses with CTL experts is noted and important for effective online delivery.
- Newly created courses could be offered to students in other existing programs.
- The program's learning objectives, structure and admission requirements are well articulated and aligned with Western's conventions.

Opportunities for Program Improvement Mentioned by Reviewers

- Inclusion of the term "Opportunity" in the program name may engender confusion. *(Embedded in Recommendation #2)*
- The requirements to take elective courses in Engineering or Science might be restricted for some Business / Social Science students (and vice-versa).
  - Course sequencing may need further consideration. This will have implications for enrolling in courses outside of a student's specialization.
- Further reflection and consensus on the vision for the program is recommended – particularly on the focus and integration of climate change.
- Possible barriers to elective options for some students based on the level of numeracy and required background knowledge.
- Careful monitoring of student engagement and originality of student work will be needed to ensure academic integrity. *(Embedded in Recommendation #6)*
- Provision of greater clarity around: 1) how projected enrollment numbers were derived; 2) the provision of administrative support; 3) job prospects for graduates; 4) how Master's Research Project (MRP) milestones will be graded and consistency will be achieved in terms of scope, student workload, level of supervision and grading criteria across the 4 specializations; 5) the involvement of the Program Director in approving applications on behalf of all 4 Faculties.

While the opportunities for improvement noted above are not all explicitly mentioned as part of the formal recommendations made by the external reviewers, they remain suggestions for consideration by the Program.

Summary of the Reviewers' Recommendations and Program/Faculty Responses

The following are the reviewers' recommendations in the order listed by the external reviewers.

Reviewers' Recommendation	Program/Faculty Response
Recommendation #1 Consider development of an MRP course to support instruction and supervision.	**Program:** As suggested, once the enrollment of the program reaches a significant level, e.g., five in each specialization, an MRP course will be created and an instructor will be hired as the coordinator for the MRP course. At low enrollment levels, the program director will act as the coordinator for the MRP milestone. The annual retreat will provide opportunities to discuss ideas for MRP. The revised brief will clarify the eligibility of each instructor for supervising MRP. **Faculty:** The program response is reasonable and a course instructor, or an interdisciplinary group of part-time instructors will be established between the involved faculties, once required by high enrollment.
Recommendation #2 Clarify and/or reconsider the name of the program	**Program:** The Program appreciates the reviewers' perspectives on the name of the program; however, declines to change the name of the program based on the following considerations: 1. The word "opportunity" in the program name conveys explicitly a sense of optimism that solutions are possible to move toward carbon neutrality and business opportunities will arise from such solutions. 2. A Graduate Diploma (GDip) program with the same name is planned to be launched in September, 2024. Using the same name for this program and the GDip aids in maintaining a strong link and effective advertising of these two programs. **Faculty:** Aligning the program's name with the corresponding GDip is a reasonable justification to keep the name as is.
Recommendation #3 Clarify that all aspects of the program will be asynchronous.	**Program:** All courses offered by the Ivey Business School are designed to be synchronous as this is central to the learning process and pedagogy at Ivey. The Ivey courses have been scheduled to be workable for all time zones in Canada as domestic students are considered the main target audiences of these courses. The courses offered by the other three faculties as well as the common course to all specializations are all asynchronous. The synchronous/ asynchronous aspect of the program will be clarified in the proposal brief and program descriptions. **Faculty:** The program has synchronous and asynchronous elements. The target market for this program is Canadian professionals, hence scheduling of the synchronous activities will take time zone variation from Eastern to Western Canada into consideration.

Recommendation #4 Clarify how EDI-DIA will be incorporated in the program.	**Program:** The common course CLMTRISK 9001 has incorporated EDI components in the context of climate change and impact. Knowledge in EDI-DIA principles and experience in incorporating these principles in their teaching will be a key consideration in selecting the instructor for CLMTRISK 9001. The program committee will work with the Course instructor to incorporate decolonization, indigenizing and just transition aspects into the course. EDI-DIA will also be implemented in other aspects of the program, e.g. the program admission process will take due considerations of special circumstances associated with equity-deserving groups and Indigenous applicants. **Faculty:** The program's response to address this recommendation is adequate.
Recommendation #5 Consider incorporating interdisciplinary language into the program core course	**Program:** The different concepts of "risk" in different disciplines and how these concepts are related to the IPCC terms will be emphasized in the common course CLMTRISK 9001. Familiarization with the interdisciplinary language is a learning outcome of this course. **Faculty:** The program's response to address this recommendation is adequate.
Recommendation #6 Address how the online program will monitor and adjust to evolving advances in generative AI to maintain the integrity of student assessment.	**Program:** Each course offered in the program will have its specific policy on the use of generative AI. The instructor for the course must indicate in the course outline whether the use of generative AI tools/software/apps is acceptable, permitted in specific situations, or unacceptable in their course. Instructors may refer to the Centre for Teaching and Learning for resources on the use of generative Artificial Intelligence in courses. **Faculty:** Common policy and language for course outlines with respect to AI have been proposed by the Graduate Education Academic Policy Committee to be approve by the Graduate Education Council (GEC) effective of May 14, 2024. This program will follow above mentioned policy.
Recommendation #7 Consider diversifying the professional development courses available to students not taking the project management option.	**Program:** The Program will coordinate with the John M. Thomson Centre for Engineering Leadership and Innovation (CELI), the Own Your Future program offered by the School of Graduate and Postdoctoral Studies (SGPS) and Western's Centre for Teaching and Learning to explore the possibility of incorporating additional modules on topics such as leadership, innovation commercialization and intellectual property into the program. **Faculty:** The program's response is reasonable and incorporating existing modules will be evaluated.

Implementation Plan

The Implementation Plan provides a summary of the recommendations that require action and/or follow-up. In each case, the Program Chair, and the Dean of the Faculty are responsible for enacting and monitoring the actions noted in Implementation Plan.

All recommendations presented by the external reviewers have been prioritized for implementation, with the exception of recommendation #2. A justification for not moving this recommendation forward has been provided in the recommendation summary table above.

Recommendation	Proposed Action and Follow-up	Responsibility	Timeline
Recommendation #1 Consider development of an MRP course to support instruction and supervision.	• Discuss and develop a plan of action for the management of the MRP at the upcoming annual retreat. • Monitor program enrollment, once enrollment exceeds about five students per specialization, create an MRP course and hire an instructor to coordinate; or, establish an interdisciplinary group of part-time instructors from the involved faculties. • Revise program proposal brief to clarify the eligibility of each instructor for supervising MRPs.	Program Director	By Sept 2026
Recommendation #3 Clarify that all aspects of the program will be asynchronous.	• Clarify the synchronous/asynchronous aspects of the program in the program proposal brief, with particular consideration of aspirations to the recruitment of international students. • Schedule synchronous activities in accordance with time zone variation from Eastern to Western Canada.	Program Director	By June 2024
Recommendation #4 Clarify how EDI-DIA will be incorporated in the program.	• Ensure that knowledge in EDI-DIA principles and experience in incorporating these principles in instruction will be a key consideration in selecting the instructor for CLMTRISK 9001. • The program committee will work with the CLMTRISK 9001 course instructor to ensure the incorporation of EDI, decolonization, and indigenization. • Integrate EDI-DIA considerations into the program admission process. Consider special circumstances associated with equity-deserving groups and Indigenous applicants. o Indicate what information will be used and how.	Program Director	By May 2025

Recommendation #5 Consider incorporating interdisciplinary language into the program core course	• Emphasize the different concepts of "risk" in different disciplines and how these concepts are related to the IPCC terms in the common course CLMTRISK 9001.	Program Director	By May 2025
Recommendation #6 Address how the online program will monitor and adjust to evolving advances in generative AI to maintain the integrity of student assessment.	• Follow policy and language for course outlines with respect to generative AI once approved (likely spring 2024). • Indicate in course outlines the conditions of use of generative AI tools/ software/ apps. • Instructors to contact the Centre for Teaching and Learning for additional resources regarding the use of generative Artificial Intelligence in their pedagogy and assessment.	Program Director	By Sept 2024
Recommendation #7 Consider diversifying the professional development courses available to students not taking the project management option.	• Examine the possibility of incorporating additional modules on topics such as leadership, innovation commercialization and intellectual property into the program. • Coordinate with the John M. Thomson Centre for Engineering Leadership and Innovation (CELI), Own your Future Program, and the CTL in support of this work.	Program Director	By Sept 2024