ACADEMIC COUNCIL REPORT

ACTION REQUESTED:

Recommendation	☐
Decision	☐
Discussion/Direction	☐
Information	☒

DATE: 28 February 2023

FROM: Graduate Studies Committee

SUBJECT: Cyclical Program Review – Doctor of Philosophy (PhD) and Master of Science (MSc) in Computer Science

COMMITTEE MANDATE:
In accordance with Article 7 of the Ontario Tech University Institutional Quality Assurance Process (IQAP) Cyclical Review (CPR) and Auditing Procedures, the appropriate standing committee of Academic Council (USC or GSC) is responsible for approving the Final Assessment Report (FAR), Executive Summary, and Implementation Plan (IP) resulting from the Review. Subsequent to this approval, the Executive Summary and IP are provided to Academic Council for information.

Additionally, in accordance with Article 6 of the IQAP Curriculum Change Procedures, editorial revisions to Program Learning Outcomes are considered Minor Program Adjustments and are sent to the standing committee for approval and reported to Academic Council for information.

BACKGROUND/CONTEXT & RATIONALE:
In academic years 2019 – 2021 a program review was scheduled for the PhD and MSc in Computer Science. The site visit was conducted in June 2022. At the completion of a CPR the appropriate standing committee of Academic Council (USC or GSC) will review and approve the FAR, Executive Summary, and IP that synthesize the recommendations resulting from the review, identify the strengths of the program as well as the opportunities for program improvement and enhancement, and outline the agreed-upon implementation plans for this improvement.

RESOURCES REQUIRED:
The Faculty's plans to address any resource needs are outlined in the IP. Information and support will be required from various areas of the University in order to implement the plan. The resources identified in the IP have been reviewed by the Academic Resource Committee and will be allocated as necessary to successfully support this program.

COMPLIANCE WITH POLICY/LEGISLATION:
The Ontario Universities Council on Quality Assurance (Quality Council), established by the Council of Ontario Universities in July 2010, is responsible for oversight of the Quality Assurance Framework processes for Ontario Universities. The Council operates at arm's length from both Ontario's publicly assisted universities and Ontario's government. Under the Quality Assurance Framework, academic programs must undergo a cyclical review at least every eight years following their implementation. The purpose of the cyclical program review is to critically examine the components of a program with the assistance of outside reviewers with the goal of continuous improvement. A program review's purpose is not solely to demonstrate the positive aspects of the program, but also to outline opportunities that will lead to improvements for the future.

NEXT STEPS:
Following presentation of the Executive Summary and IP to Academic Council and the Board of Governors for information, the FAR, Executive Summary, and IP will be sent to the Quality Council as required under the Quality Assurance Framework. A summary report is then posted on the Ontario Tech corporate website.

The approved FAR, Executive Summary, and IP will be provided to the Faculty, through the Dean, to serve as the basis for the continuous improvement and monitoring of the program. A report from the program outlining the progress that has been made in implementing the recommendations will be put forward in eighteen months' time.

SUPPORTING REFERENCE MATERIALS:

- Implementation Plan
- Executive Summary
- PLO Enhancement and DLE Mapping

IMPLEMENTATION PLAN
December 23, 2022
Doctor of Philosophy (PhD) and Master of Science (MSc) in Computer Science
Program Review
Deans: Dr. Greg Crawford, Dr. Michael Bliemel, Dr. Hossam Kishawy

The Implementation Plan is a critical outcome of the Cyclical Program Review process. The Dean solicits feedback on the Implementation Plan through Faculty Council and the plan is reviewed by the Provost, through the Resource Committee, to examine resource implications and allocations. A Final Assessment Report (FAR) and Executive Summary are prepared synthesizing the program review reports and responses, following review of the Implementation Plan by the Resource Committee. The plan proceeds through Ontario Tech's governance process and is posted on the corporate website.

The table below presents a timeline of the follow-up and resource requirements addressing the recommendations from the external reviewers' report.

Recommendation (corresponding # from reviewers' report)	Action Item(s)	Specify role of person responsible	Timeline for action and monitoring	Resource Requirements
1. ~~Waive international tuition differential~~ **Correction**: The university to consider charging international students who are being funded on tri-council grants the same tuition rates as domestic students.	Discussion among institutional stakeholders on how this might be managed or mitigated	Deans, GMC, SGPS, Provost Office, CS faculty representatives	By November 30, 2022 – preliminary discussions (in prep for 2023/24) By November 30, 2023 – subsequent discussions (in prep for 2024/25)	TBD

2.	Increase number of TTT, TF; allow professors to teach at least one grad course per year	Science Dean will propose additional hires in CS (supported by CS UPR findings)	Science Dean	December 2022 – Science budget proposal submission	Funding for additional CS faculty positions
		Deans and GMC will work with others to investigate other opportunities for more grad-level teaching	Deans, GMC, CS program faculty	By January 2023 – preliminary 2023/24 teaching workload discussions	TBD
3.	Increased legal support for industry grants/contracts	Assessment of need and discussion of options	Deans, GMC, faculty, OVPRI	By March 2023 – preliminary meeting(s)	TBD
4.	Extend GPD role to 3 years	Deans are agreeable but will depend on faculty agreement; this should not be forced	N/A	N/A	N/A
	Create an office run by administrators for the program within a single Faculty	Review current admin supports and determine what may be shifted for clarity and consistency	Deans, GMC, faculty and students (consultation)	May 2023	N/A
		Create a resource for faculty and students to understand where to find such resources	Deans, Faculty admin staff	August 2023	N/A
5.	Arrange regular formal/informal meetings with students	GPD to initiate a regular meeting with grad students each semester	GPD	By Nov. 2022	N/A
		Investigate additional ways to support student meetings	Deans, GPD, GMC, faculty, SGPS	By February 2023	N/A
6.	Improve TA workload assignments, including alignment of student expertise with assignment	Review and seek to improve the processes by which TA assignments are determined and operationalized	Deans, GMC, those involved in assigning TAs to CS graduate students	By May 2023	N/A

#					
7.	Allow for grad-level co-op terms	Deans and GMC to discuss how this might be implemented	Deans, GMC, faculty (consultation); possibly student consultation as well	By May 2023	TBD
8.	Engage alumni more effectively	Deans and GMC to discuss how this might be implemented	Deans, GMC; possibly Alumni Association as well	By May 2023	TBD
10.	Offer alternative funding packages (e.g., more research assistantships)	Deans and GMC to discuss options; follow up with Provost's Office	Deans, GMC, Provost Office	By June 2023	TBD
11.	Create an admission committee to do final approval of admitted files	GMC to meet with SGPS to discuss options	GMC, SGPS	June 2023	TBD

*The Dean shall be responsible for monitoring and reporting on the Implementation Plan.

Recommendations not Addressed and Rationale

#	Recommendation not Addressed	Rationale
9.	Employ someone to manage alumni relationships	The Deans and GMC will discuss ways in which alumni can be better engaged (Recommendation #8). The solution to any administrative support for such an effort is yet to be determined.

Due Date for 18-Month Follow-up Report: April 2024
Date of Next Cyclical Review: 2027-2029

FINAL ASSESSMENT REPORT
Executive Summary
Cyclical Program Review

Degree Program:	Doctor of Philosophy (PhD) and Master of Science (MSc) in Computer Science
Fields:	Digital Media Information Science Networks and IT Security Software Design
Dean(s):	Dr. Greg Crawford, Dr. Michael Bliemel, Dr. Hossam Kishawy
Date:	December 23, 2022

Under Ontario Tech University's Institutional Quality Assurance Process (IQAP) and the Ontario Quality Assurance Framework (QAF), all programs are subject to a comprehensive review at least/at minimum every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence.

In academic years 2019 – 2021 a program review was scheduled for the Doctor of Philosophy (PhD) and Master of Science (MSc) in Computer Science programs. This is the second program review for this program. A timeline of the review is provided below.

Program Review Timeline	Date
Program Review start date:	October 24, 2019
Self Study submitted/approved:	May 26, 2022
Site Visit:	June 27-28, 2022
External Reviewers Report received:	August 8, 2022
Program Response received:	September 9, 2022
Decanal Response received:	October 14, 2022

The external reviewers provided evidence and recommendations in their report consistent with concerns raised by the Program in the self-study brief and during the site visit. Overall, the outcome of the program review was very productive and a clear implementation plan has been developed to ensure the highest standard of academic excellence is met within the Master of Science and Doctor of Philosophy in Computer Science programs.

The most significant strength is the interdisciplinary nature of the program. Also, the program is taught by faculty with highly different backgrounds that lends to diverse research being conducted ultimately enriching the student experience. The faculty qualifications for research and scholarly record are notably very strong and this coupled with many active research labs and facilities makes for a beneficial learning environment. Limiting the program is graduate course offerings aligned with specialty fields, minimum funding levels and experiential learning opportunities to further strengthen career readiness.

The review consisted of three external reviewers. During the virtual site visit, the reviewers met with the following groups and individuals:

Dr. Langis Roy	Deputy Provost
Dr. Greg Crawford	Dean of Science
Dr. Michael Bliemel	Dean of Business and IT
Dr. Bernadette Murphy	Dean of Graduate Studies
Dr. Patrick Hung	Chair of Internal Assessment Team
Dr. Christopher Collins	Internal Assessment Team
Dr. Richard Pazzi	Internal Assessment Team
Dr. Shahryar Rahnamayan	Internal Assessment Team
Patricia MacMillan	Academic Planning Specialist

A number of faculty, staff, and current students were also present throughout the duration of the site visit.

The external reviewers identified eleven recommendations identifying specific steps to be taken to improve the program. The recommendations focused on teaching and administrative support, enhancing relations with students and alumni and investigating funding opportunities to support students. The prioritized list of recommendations is available in the Implementation Plan.

A Final Assessment Report (FAR) has been prepared to synthesize the reports and recommendations resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. The Implementation Plan (IP) presents a timeline of the follow-up and resource requirements addressing the recommendations from the external reviewers' report. Both documents, accompanied by this Executive Summary (ES), will be delivered to the appropriate standing committee of Academic Council (USC/GSC) for approval on **January 17, 2023**.

Governance	Document(s)	Type of review	Date
Faculty Councils	IP	Feedback	November 16, 2022
Resource Committee	IP	Resource review	December 19, 2022
USC/GSC	FAR, ES, IP	For approval	January 17, 2023
Quality Council	FAR, ES, IP	QAF requirement	
Academic Council	ES, IP	For information	
Board of Governors	ES, IP	For information	
Corporate Website	ES, IP	QAF requirement	

Due Date for 18-Month Follow-up Report: **April 2024**

Date of Next Cyclical Review: **2027-2029**
      Timeframe for associated site visit: **Winter 2029**

Cyclical Program Review: Summary of program learning outcome enhancements
[This form should be used in cases where program learning outcomes have been enhanced for an existing undergraduate or graduate program as the result of a cyclical program review. The program and course learning outcomes must be reviewed and revised using resources provided by CIQE and the Teaching and Learning Centre (TLC). This form will be appended to the Final Assessment Report and presented at the appropriate standing committee of Academic Council (USC or GSC) for approval.]

Faculty: Science, Business and Information Technology, Engineering and Applied Science
Program: Doctor of Philosophy (PhD) and Master of Science (MSc) in Computer Science
Review year: 2019-2021

Undergraduate: ☐	**Graduate**: ☒

Original program learning outcome(s): (Provide all of the initial program learning outcomes)

The objectives of the MSc program are to: 1. Provide students with a broad background in information technology along with an in-depth study of the student's selected field. 2. Provide the student with research and design experience through a series of group and individual projects. 3. Develop collaborative and management skills through participation in multidisciplinary teams. 4. Provide the academic background and intellectual stimulation that will prepare students for further studies. 5. Prepare students for leadership and management roles in the information technology industry. **The objectives for the PhD program include the MSc objectives plus the following additional objectives:** 6. Provide students with in depth knowledge of their chosen field through participation in one or more research projects leading to the production of a thesis. 7. Provide students with the communications skills required in both industry and academia. 8. Provide students with experience in the preparation of papers for academic journals and conferences that effectively communicate the results of their research.

Total number of original outcomes: 5 (MSc) and 8 (PhD)

Proposed enhanced learning outcomes: (Updated outcomes as a result of the program review learning outcome workshops)

- Explain a broad range of computer science topics and concepts with accuracy and precision.
- Evaluate research in their specific area.
- Produce scientific solutions to relevant computer science problems.
- Demonstrate technical and research competency when participating in diverse, inter- and multi-disciplinary teams.
- Evaluate and solve real world problems by using computer science theory, methods and techniques.
- Author reports (including oral presentations) of research to effectively communicate with peers in academia, practitioners in industry, and the general public.
- Formulate a research plan using appropriate computer science problem-solving methods. *(PhD only)*

Total number of enhanced outcomes: 6 (MSc) and 7 (PhD)

Have the enhanced outcomes been mapped to the degree-level expectations (DLEs)?

☒ **Yes**   ☐ **No**

If no, this should be completed no later than:

Are you providing any additional supporting documents? ☒ **Yes**   ☐ **No**

If yes, which (list all)?

The GDLE map for both the MSc and PhD will be provided.

<u>**CIQE INTERNAL APPROVAL**</u>

Appended to FAR	
FAR, Outcomes, Executive Summary, Implementation Plan approved by USC/GSC	
Final Approved FAR, Outcomes, Executive Summary and Implementation Plan sent to Faculty, through the Dean, as primary owner	
Outcomes entered into Curriculog	

PhD Computer Science graduate program learning outcomes:	Explain a broad range of computer science topics and concepts with accuracy and precision.	Evaluate research in their specific area.	Produce scientific solutions to relevant computer science problems.	Demonstrate technical and research competency when participating in diverse, inter- and multi-disciplinary teams.	Evaluate and solve real world problems by using computer science theory, methods and techniques.	Author reports (including oral presentations) of research to effectively communicate with peers in academia, practitioners in industry, and the general public.	Formulate a research plan using appropriate computer science problem-solving methods.
Depth and Breadth of Knowledge	X	X		X	X		X
Research and scholarship		X	X	X	X	X	X
Level of Application of Knowledge			X	X	X		
Communication Skills				X		X	X
Awareness of limits of knowledge		X	X	X	X	X	X
Autonomy/Professional capacity			X	X	X	X	X

Master of Computer Science	Explain a broad range of computer science topics and concepts with accuracy and precision.	Evaluate research in their specific area.	Produce scientific solutions to relevant computer science problems.	Demonstrate technical and research competency when participating in diverse, inter- and multi-disciplinary teams.	Evaluate and solve real world problems by using computer science theory, methods and techniques.	Author reports (including oral presentations) of research to effectively communicate with peers in academia, practitioners in industry, and the general public.
Depth and Breadth of Knowledge	X(x)	X(x)		X	X	
Research and scholarship		X(x)	X	X(x)	X(x)	X(x)
Level of Application of Knowledge			X	X	X	
Communication Skills	X			X		X(x)
Awareness of limits of knowledge		X	X	X	X	X(x)
Autonomy/Professional capacity			X	X	X	X(x)

X(x) icon demonstrates alignment to the expectation area at the MSc level and is extended at the PhD level