

ACADEMIC COUNCIL REPORT

ACTION REQUESTED:

Recommendation
Decision
Discussion/Direction
Information

DATE: 22 November 2022

FROM: Undergraduate Studies Committee

SUBJECT: Outcomes from the Cyclical Program Review – Bachelor of Science in Computer Science

COMMITTEE MANDATE:

In accordance with Article 8 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.

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.

BACKGROUND/CONTEXT & RATIONALE:

In academic years 2019 – 2021 a program review was scheduled for the Bachelor of Science in Computer Science. The site visit was conducted in May 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 action plan. Information and support will be required from various areas of the University in order to implement the plan. The Academic Resource Committee has reviewed the resources identified in the IP.

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, a Final Assessment Report (FAR), the Executive Summary, and the 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 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 UDLE Mapping



IMPLEMENTATION PLAN
October 11, 2022
Bachelor of Science in Computer Science
Program Review
Dean: Dr. Greg Crawford

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, following review by the Resource Committee, synthesizing the program review reports and responses. Furthermore, the Implementation 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 <i>(corresponding # from reviewers’ report)</i>		Action Item(s)	Specify role of person responsible	Timeline for action and monitoring	Resource Requirements
1.	More research faculty (6 hires in 3 years; at least 3 TTT).	1. Conduct the two net new TTT for 2022-23. 2. Develop a longer-term (~3 year) data-driven hiring plan/budget that engages budget decision-makers; include in 2023-24 budget proposal.	1. Dean/Faculty 2. Dean/Faculty/Provost/ AVP-PSA	1. Complete by Dec. 2022 2. Sept. 2022 – March 2023	1. HR (normal search processes) 2. OIRA (data/analysis support)

2.	Consistent course scheduling and teaching.	1. For 2023-24 schedule review increased teaching capacity and expertise; make first adjustments to expanding upper level offerings. 2. For 2024-25 schedule review increased teaching capacity and expertise; make first adjustments to expanding upper level offerings.	1. UPD/Faculty 2. UPD/Faculty	1. January 2023 2. January 2024	n/a
3.	Additional lab (technical) support.	Develop a 3-year plan to expand technician support for undergrad CS labs (tied to the planning process described in Recommendation #1).	Dean/Faculty/DPO	Draft plan complete by Nov 2022	n/a
4.	Include O'Reilly books in Library offerings.	Work with Library to determine how best to meet this request.	Dean/Faculty/University Librarian	Draft plan complete by Oct 2022	Library
6.	Study retention rates between second and third year.	Conduct study and report results.	Faculty	Complete by July 2023	OIRA

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

**The Resource Committee notes that resources identified in the Implementation Plan have been and will continue to be reviewed and allocated as necessary to successfully support this program.

Recommendations not Addressed and Rationale

#	Recommendation not Addressed	Rationale
5.	Curriculum: Reconsider 2 physics course requirement.	The program faculty and Dean are satisfied with the current requirement for now. It is seen as valuable as preparation for many senior electives; furthermore, it does not seem to significantly impact recruitment, nor retention to second year at present. As program faculty numbers increase, expertise diversifies, and new programs/specializations come online, we will revisit this.

Due Date for 18-Month Follow-up Report: February 25, 2024

Date of Next Cyclical Review: 2027 - 2029

**FINAL ASSESSMENT REPORT
Executive Summary
Cyclical Program Review**

Degree Program:	Bachelor of Science in Computer Science
Components:	<ul style="list-style-type: none"> • Comprehensive • Comprehensive, with co-op option • Data Science Specialization • Data Science Specialization, with co-op option • Digital Media Specialization • Digital Media Specialization, with co-op option • Advanced Entry for Computer Engineering Technology diploma graduates (to Comprehensive) • Advanced Entry for Computer Programmer Analyst diploma graduates (to Comprehensive)
Dean:	Dr. Greg Crawford
Date:	October 11, 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 Bachelor of Science in Computer Science. 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:	September 23, 2019
Self Study submitted/approved:	February 2, 2022
Site Visit:	May 2 -3, 2022
External Reviewers Report received:	June 16, 2022
Program Response received:	July 21, 2022
Decanal Response received:	August 26, 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 Bachelor of Science in Computer Science program.

Many program strengths were identified by the external reviewers including the impressive structure of the program, the inclusion of Data Science and Digital Media courses, notable strength of faculty members, and the excellent support from academic services. An area of improvement noted by the reviewers focused on the need for additional hires to allow research faculty to teach upper-year courses. Areas of enhancement include additional library resources, lab support and consistent course scheduling and teaching.

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

Dr. Lori Livingston	Provost & VP Academic
Dr. Greg Crawford	Dean of Science
Mr. Randy Fortier	Chair of Internal Assessment Team
Clarissa Livingstone	Quality Enhancement Analyst, CIQE
Dr. Jeremy Bradbury	Internal Assessment Team, Associate Professor and Associate Dean of Graduate Studies
Dr. Christopher Collins	Associate Professor and Canada Research Chair in Linguistic Information Visualization
Dr. Ken Pu	Internal Assessment Team
Dr. Jaroslaw Szlichta	Undergraduate Program Director
Sarah Rasile	Director, Student Success
Melanie Hewitt	Manager, Data Analytics and Assessment
Emily Tufts	Associate University Librarian

Faculty, Teaching Assistants, current students, Lab Technician, Co-operative Education Coordinator, Program Assistant and Academic Advising team members were also present.

The external reviewers identified six recommendations identifying specific steps to be taken to improve the program. The recommendations focused on research faculty and technical lab support, consistency with course scheduling and teaching, and studying retention rates specifically between second and third year of the program. 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 **October 18, 2022**.

Governance	Document(s)	Type of review	Date
Faculty Council	IP	Feedback	September 14, 2022
Resource Committee	IP	Resource review	September 19, 2022
USC/GSC	FAR, ES, IP	Approval	October 18, 2022
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: February 26, 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. These updated program learning outcomes should be the result of a program review and have been developed with guidance from CIQE. This form will be appended to the Final Assessment Report]

Faculty: Science	
Program: Computer Science	
Review year: 19-21	
Undergraduate: <input checked="" type="checkbox"/>	Graduate: <input type="checkbox"/>

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

- Apply knowledge and understanding of the concepts, theories, and principles of computing science as they relate to theoretical and applied aspects of the discipline.
- Explore the current state of knowledge in computing science and investigate innovative solutions to significant related problems.
- Utilize knowledge to analyze, evaluate, and apply the concepts, techniques or processes needed in the study and application of computing science.
- Communicate effectively in written, spoken and visual format with both technical experts and members of the general public on a range of issues, including those related to the discipline of computing science.
- Contribute as effective participant in multi-disciplinary and multi-cultural teams, in both membership and leadership roles.
- Recognize and value the alternative outlooks that people from various social, ethnic and religious backgrounds may bring to endeavours in computing science and its fields of application.
- Understand management and/or business practices relevant to employment situations, including the importance of quality management and quality performance (and Management option that is currently under development).
- Have well developed strategies to update knowledge, maintain and enhance learning.

Total number of original outcomes: 8

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

- Practice communicating technical computer science knowledge in various modes and formats including written, spoken and visual.
- Recognize the value of equity, diversity and inclusion in computer science.

- Choose socially responsible computer science practices.
- Develop computer science solutions to industry-relevant problems.
- Apply strategies to continually enhance their computer science knowledge and skills.
- Apply concepts, theories, and principles of computer science.
- Evaluate and analyze the concepts, techniques or skills needed in the study and application of computer science.
- Evaluate and utilize best practices in the design and development of software and systems.
- Demonstrate the ability to work effectively both independently and in teams.

Total number of enhanced outcomes: 9

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 DLE alignment map that was completed as part of the program review.

	Practice communicating technical computer science knowledge in various modes and formats including written, spoken and visual	Recognize the value of equity, diversity and inclusion in computer science	Choose socially responsible computer science practices.	Develop computer science solutions to industry-relevant problems	Apply strategies to continually enhance their computer science knowledge and skills.	Apply concepts, theories, and principles of computer science.	Evaluate and analyze the concepts, techniques or skills needed in the study and application of computer science.	Evaluate and utilize best practices in the design and development of software and systems.	Demonstrate the ability to work effectively both independently and in teams.
Depth and Breadth of Knowledge					X	X	X	X	
Knowledge of methodologies- An understanding of methods of enquiry or creative activity, or both, in their primary area of study that enables the student to:				X	X	X	X	X	
Application of Knowledge-The ability to review, present and critically evaluate qualitative and quantitative information to:	X		X	X		X	X	X	
Communication Skills	X	X							X
Awareness of limits of knowledge				X	X	X			
Autonomy and professional capacity- Qualities and transferable skills necessary for further study, employment, community involvement and other activities requiring:		X	X	X	X			X	X