




## **Final Assessment Report & Implementation Plan – Executive Summary** **BSc Computer Science, BA Computing Systems,** **BA/BSc Information Systems, BSc Computer Science & Physics**

Completed by the Cyclical Program Review Committee (CPRC)

<b>Degree Programs Reviewed</b>	BSc Computer Science BA Computing Systems General & Honours Joint-Major BA/BSc Information Systems Joint-Major BSc Computer Science & Physics
<b>External Reviewers</b>	Dr. Michael Jenkin, York University Dr. Beatrice Ombuki-Berman, Brock University
<b>Internal Representative</b>	Dr. Terry Humphreys, Department of Psychology, Trent University
<b>Year of Review</b>	2021-2022
<b>Date of Site Visit</b>	March 21-23, 2022
<b>Due Date for Implementation Report from the Program</b>	April 1, 2024
<b>Date Prepared by CPRC</b>	January 18, 2023
<b>Date Approved by Provost &amp; VP Academic</b>	February 3, 2023
<b>Signature of Provost &amp; VP Academic</b>	

It is an exciting time to study Computer Science at Trent. Society is in the midst of a technology revolution, which is fueled by the advancement of knowledge in computing. Creating, manipulating, and speaking the language of technology have become some of the most valued skills applicable to almost every industry. Computer Science/Studies is ubiquitous and, as such, continues to grow and is ever-changing, resulting in new job opportunities materializing every year.

At Trent University, students can pursue Computer Science in a variety of ways at either of our campuses. There are many paths to choose from: BA/BSc, single or joint-major, as well as several experiential learning opportunities to gain real-world experience. Students can take advantage of a co-op program (Peterborough campus), a third-year Internship course, or a fourth-year Software Engineering course, where students work in groups on software projects for real-world clients.

### **Overview**

During the 2021-2022 academic year, the undergraduate programs in Computer Science underwent a review. Two arm's length external reviewers, Dr. Michael Jenkin, York University, and Dr. Beatrice Ombuki-Berman, Brock University, were invited to review the self study documentation. The virtual

visit took place on March 21-23, 2022. Dr. Terry Humphreys, internal representative, from the Department of Psychology participated in the virtual visit.

This Final Assessment Report (FAR), in accordance with Trent University's Institutional Quality Assurance Policy (IQAP), provides a synthesis of the cyclical review of the degree programs. The Report considers: the Self-Study, the External Reviewers' Report, and the Program and Decanal Responses.

A summary of the review process is as follows: the academic unit completed a self-study that addressed all components of the evaluation criteria as outlined in Trent's IQAP. Appendices included: Curriculum Vitae, Course Syllabi, Data Tables, Student and Alumni Surveys and a Library Statement of Support. Qualified external reviewers were invited to conduct a review of the programs that involved a review of all relevant documentation (self-studies, appendices, and IQAP policy) and participation in a virtual visit. During the virtual site visit, reviewers met with senior administration, faculty, students and staff.

The External Reviewers' Report identified fifteen (15) recommendations with the primary focus being to provide a program that is both sustainable and of high quality. Ideally, recommendations will focus on a culture of ongoing and continuous improvement, and prioritizing student-centred learning and experiences.

Following receipt of the External Reviewers' Report, the Program and Dean provided responses to the Report. Based on the four review documents, the Cyclical Program Review Committee (CPRC) then reviewed and assessed the quality of the degree programs and reported on significant program strengths, opportunities for improvement and enhancement, and the implementation of recommendations.

The Implementation Plan identifies fourteen (14) recommendations for implementation, and specifies the proposed follow-up and the person(s) responsible for leading the follow-up. The Academic Unit, in consultation with their Dean, will submit an Implementation Report in response to the recommendations identified for follow-up. The Report is due April 1, 2024.

### **Significant Program Strengths**

One area of significant strength in the curriculum is Data Analytics. Courses have been introduced in this area over the past several years and in 2016, a specialization in Data Analytics at the undergraduate level was formally established. In 2018, the academic unit introduced a minor in Data Analytics, as well as the first course-based MSc program in Big Data in Canada. Both programs have sustained substantial student interest, and the course-based MSc program now receives the most applications of any graduate program at Trent, with the majority of applications coming from international students. The success and demand for these programs is such that the department will launch a new BSc in Data Science in Fall 2023.

Another area of pride for the Computer Science department is the quality of faculty and staff involved who provide an excellent learning environment for our students. Instructors are caring, dedicated,

passionate and innovative experts in the field. Support staff go above and beyond to ensure students have everything they need to be successful.

As mentioned above, there are many paths for students to choose from within the Computer Science field at Trent. It is not just a standalone discipline here - many fields of study involve computing either directly or indirectly: Computer Studies and Cultural Studies = Media Studies; Computer Science and Geography = Geographic Information Systems (GIS); Computer Science/Studies and Business Administration = Information Systems; Computer Science, Physics and Mathematics = Computer Science & Physics; and Computer Science and any field that uses large amounts of data = Data Analytics. Computer Studies is a natural discipline for a joint-major and all of these options are available at Trent. Although a strength, offering many degree programs does present its own challenges in relation to optimization of faculty resources and succession planning.

### **Opportunities for Program Improvement and Enhancement**

Computer Science is a small department that performs the same teaching, research, and administrative functions as all academic departments at Trent. As identified by the external reviewers, the department also offers more program choice and streams than might be optimal based on the current faculty complement. The department is encouraged to review the program offerings in relation to faculty resources and potential retirements, taking into consideration overlapping needs and curriculum.

To enhance the student experience, the department should consider increasing experiential learning opportunities through the expansion of co-op placements and the introduction of more capstone courses. A foundation of established relationships with many local companies already exists, which provides an excellent source for co-op placements and helps to drive project selection for internship projects. It would be beneficial to build on this and make the co-op program available to more students, as well as work to expand the network of co-op employers to include opportunities outside of the local community.

As enrolment in Computer Science programs continue to grow in Durham, priority considerations will include identifying adequate lab space and expanding the co-op option to students in Durham.

Resources permitting, one area that could be further developed to provide further depth and breadth within the department and computer science would be 'computer security', an in-demand field of study at many universities across the province.

As a function of continuous improvement, it is also critical to identify ways in which the department can regularly monitor and assess the level of student satisfaction and success to ensure curriculum remains relevant, current and effective within the discipline. The department is encouraged to review curriculum offerings on an annual basis and begin to offer exit surveys to recent graduates.

## Implementation Plan

The Implementation Plan identifies those recommendations that require action by the academic unit. The Chair or Director, with members of the academic unit, will be responsible for leading the follow-up in consultation, and where appropriate with Dean(s) and other university departments. The Academic Unit will report on actions taken and the status of each recommendation by the due date provided. The Dean will be responsible for Reviewing the Implementation Report and submitting the final report to the Office of the Provost.

Recommendation	Proposed Follow-Up If no follow-up is recommended, indicate 'No follow-up report is required' and provide rationale	Specific Timeline For addressing or completing recommendation	Position Responsible for Leading Follow- up
<p><b>Program Offerings and Faculty Resources</b></p> <p><b>Recommendation 1</b> That the department move to harmonize its program offerings to bring it more in line with the expected full-time faculty complement of the unit.</p> <p><b>Recommendation 2</b> That the department develop a strategic plan that can be used to inform future hiring and program offerings and its concentration at Peterborough and Durham.</p> <p><b>Recommendation 7</b> That hiring for the department work to (i) limit reliance on non-tenure stream faculty across both Durham and Peterborough to be less than 30% of all courses offered, (ii) hire faculty at a range of different career stages to provide effective succession planning.</p>	<p>That subsequent updates to the three year rolling departmental academic plan include a robust strategy for faculty renewal and succession.</p> <p>The department is encouraged to review the program offerings in relation to faculty resources and potential faculty retirements, i.e., overlapping curriculum and potential streamlining of programs.</p> <p>The Implementation Report should include a summary of the department's review of the degree programs; any changes to programs that create efficiencies based on faculty expertise; and faculty renewal and succession.</p>	<p>Faculty Renewal and Succession Planning – ongoing</p> <p>Review of Program Offerings – should be completed for Nov 2023</p>	<p>Chair and Deans</p> <p>Chair</p>
<p><b>Curriculum Review and Student Performance</b></p> <p><b>Recommendation 4</b> That the department establish an ongoing process to formally</p>	<p>The Department establish an ongoing process to review the curriculum for its degree</p>	<p>Processes should be determined by December 2023</p>	<p>Chair</p>

<p>renew and maintain its programs and courses.</p> <p><b>Recommendation 14</b> That the department more systematically track student performance both while enrolled and post-graduation.</p>	<p>programs, and to monitor student performance.</p> <p>The Implementation Report will outline the process for curriculum review and for tracking current student progress, and post-graduate success (i.e., grad school, employment).</p>		
<p><b>Experiential Learning and Alumni Engagement</b></p> <p><b>Recommendation 5</b> That additional experiential educational opportunities be integrated into programs that currently lack them (e. the introduction of a required capstone course similar to that found in the Software Engineering stream).</p> <p><b>Recommendation 6</b> That the co-op program be expanded and made available to more students, and that the local set of co-op employers be expanded outside of the region.</p> <p><b>Recommendation 10</b> That the department better leverage alumnae in terms of promoting the programs for recruitment and employment prospects for graduates.</p> <p><b>Recommendation 11</b> That the department better leverage alumnae and local industry to strengthen the co-op offerings and to help inform curricular development.</p>	<p>That the program gradually adds capstone or project courses to COIS degrees.</p> <p>That the program increases the enrolment in co-op programs</p> <p>That the department, in consultation with the Alumni Association begin building a database of Alumnae and develop a robust outreach program. These initiatives can then be leveraged for program promotion and student placements.</p> <p>The Implementation Report should outline any additional experiential learning opportunities developed/offered; any developments with co-op and Careerspace; and any advancements with respect to an alum database.</p>	<p>Should be in place for May 2024</p> <p>Should be in place for 2024-25</p> <p>Consultation and process should be developed and in place for September 2024</p>	<p>Chair</p> <p>Chair</p> <p>Chair</p>

<p><b>Admissions &amp; Enrolment</b></p> <p><b>Recommendation 12</b> That minimum admission requirements be reviewed to ensure (i) students have the necessary background in mathematics to engage in more mathematical aspects of computer science, and (ii) students have the necessary English language skills to participate in the program and to be contributing employees upon graduation.</p> <p><b>Recommendation 15</b> Establish realistic goal targets for COIS enrolments and adjust admission criteria to track this target.</p>	<p>That the program reviews current admission requirements.</p> <p>The department should consider optimal enrolment and pressure points in terms of managing student numbers. (e.g., is there one degree program that is less manageable than others? is one year of program less manageable than others?)</p> <p>The Implementation Report will comment on the department's ability to deliver the degree programs as they currently exist, and/or identify shortages to deliver or teach students. The Department should identify what supports are needed to do this better or adequately.</p>	<p>Review completed by November 2023</p> <p>October 2023</p>	<p>Chair</p> <p>Chair</p>
<p><b>Articulation Agreements</b></p> <p><b>Recommendation 9</b> That the university work to streamline the articulation agreements so as to reduce complexity/confusion on the part of applicants and staff, and to reduce workload for the university.</p>	<p>The current process for articulation agreements requires departmental consultation, managed by the Transfer Pathways Office.</p> <p>The Chair and Deans should meet with Articulation staff to ensure COIS is consulted with respect to any new COIS articulations or any modifications to requirements.</p> <p>The Implementation Report should report on consultations that took place.</p>	<p>Should be ongoing however initial consultation should take place by Sept 2023.</p>	<p>Chair</p>

<p><b>Supports</b></p> <p><b>Recommendation 3</b> That specialized teaching laboratories be established to augment centralized computer teaching infrastructure.</p> <p><b>Recommendation 8</b> That the roles of admin staff (technical support, advising, teaching support) be reviewed to optimize the utilization of local staff, and where desirable, to transfer workload outside of the unit.</p>	<p>Departments in consultation with Deans should identify future teaching space needs and explore opportunities for adding dedicated labs in Peterborough and Durham.</p> <p>The Implementation Report should provide details of this consultation.</p> <p>No follow up is required.</p> <p>Additional support staff has already been hired into the department, which resulted in a review of existing support staff positions and responsibilities.</p>	<p>Sept 2023</p>	<p>Chair</p>
<p><b>Academic Integrity</b></p> <p><b>Recommendation 13</b> That mechanisms be established to ensure that academic integrity of courses be promoted and maintained</p>	<p>Faculty/instructors are encouraged to review assessment and evaluation tools and consider alternatives. Assessments should be determined through the lens of academic integrity. The Department should monitor and update practices regularly in order to remain current in a situation that is continuously evolving.</p>	<p>May 2023</p>	<p>Chair in consultation with CTL</p>