McMaster University

FINAL ASSESSMENT REPORT

Institutional Quality Assurance Program (IQAP) Review

Computing and Software (Graduate programs)

Date of Review: May 2nd and 3rd

In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response and assessments of the graduate programs delivered by Computing and Software. This report identifies the significant strengths of the program, together with opportunities for program improvement and enhancement, and it sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources entailed by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations and who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

Executive Summary of the Review

In accordance with the Institutional Quality Assurance Process (IQAP), the Computing and Software department submitted a self-study in April 2022 to the Vice-Provost and Dean of Graduate Studies to initiate the cyclical program review of its graduate programs. The approved self-study presented program descriptions, learning outcomes, and analyses of data provided by the Office of Institutional Research and Analysis. Appendices to the self-study contained all course outlines associated with the program and the CVs for each full-time member in the department.

Two arm's length external reviewers and one internal reviewer were endorsed by the Dean, Faculty of Engineering and selected by the Vice-Provost and Dean of Graduate Studies. The review team reviewed the self-study documentation and then conducted a review on May 2nd and 3rd, 2022. The review included interviews with the Provost and Vice-President (Academic); Vice-Provost and Dean of Graduate Studies, Associate Dean, Grad Studies and Research, Chair of the department and meetings with groups of current students, faculty and support staff.

The Chair of the Department and the Dean of the Faculty of Engineering submitted responses to the Reviewers' Report (July 2022). Specific recommendations were discussed and clarifications and corrections were presented. Follow-up actions and timelines were included.

- **Strengths**

The reviewers noted the depth and breadth of the graduate degree programs offered to provide students with advanced knowledge and capabilities. The high calibre faculty and commitment to teaching and scholarship were noted, especially given the growth in recent admissions and increased workload. The

annual research poster and demo showcase were highlighted to share student accomplishments, satisfy degree requirements, and towards building community.

- **Areas for Enhancement or Improvement**

The department is in the midst of a major expansion, and brings challenges regarding: new faculty mentoring, graduate recruitment, space allocation, and initiatives to build department community. While the proportion of female faculty has increased significantly in recent hiring, developing a strategic plan would help to advance EDI in admissions, teaching and research.

Summary of the Reviewers' Recommendations with the Department's and Dean's Responses

Recommendation	Proposed Follow-Up	Responsibility for Leading Follow-Up	Timeline for Addressing Recommendation
Program			
Reduce student/faculty ratio to closer to average in the faculty	With ongoing hiring, this ratio should be reduced, but will take time. CAS is in the process of hiring 6 faculty members this year, 4 the next year and 1 the year after. This should improve the student to faculty ratio, though there is increased demand for all of the Department's programs. The Dept chair to engage with discussions at the Faculty level on future hiring allocations.	Chair / Dean	2023/2024
Develop a dept. EDI committee to investigate initiatives to eliminate biases in dept. operations, learning, research.	Setup an EDI committee with faculty, staff and student representatives to explore current gaps, and preliminary solutions.	Chair	August 2022

Community Building	1) With a larger faculty complement, contiguous space is vital towards building connections and community. Initial discussions with University Administration has begun on building new space to house the department. 2) Online communities for students and faculty of shared interests. 3) Scheduling of summer and holiday retreats. The CAS Department BBQ for faculty staff and graduate students will take place July 22, 2022 and the Holiday dinner will be scheduled for December 2022 at the end of term.	Chair/ Grad Chair / Staff / LiCS	2022 onwards
	4) Sponsoring more faculty + student events throughout the year CAS will have a graduate student welcome event in September 2022 for all graduate students and faculty. Also the Department has increased funding to LiCS for weekly coffee house events in the department 5) Work with LiCS and Women in CS communities. The Chair met with LiCS President and Secretary June 7, 2022 to review the LiCS budget and events plan for the coming year and discussed ways to further build the graduate student and faculty community.		

Introduce formal faculty mentoring program for new hires to bring them up to speed and share best practices.	The Chair met with all assistant professors as part of their annual performance review and discussed potential mentors with them, assigning a mentor to each new faculty member. The goal will be to start this process sooner, typically within the first two weeks of the faculty member's arrival and then review their assigned mentor at their annual performance review. The Faculty of Engineering also has an extensive mentoring program through the Fireball Academy that provides courses for new faculty members on successfully navigating the T&P process at McMaster, writing successful grants, and supervising graduate students.	Associate Chair Research	2022/2023
Re-engage w/ Advisory Board	Currently the CAS Continuous Improvement Committee serves as the advisory board	Chair	2022/2023

	for the department with feedback on the undergraduate and graduate programs. It consists of faculty, industry representatives, alumni and current students. The Department will consider establishing a separate Advisory Board less focused on undergraduate issues that would consider long term Departmental opportunities and strategy.		
Develop "research methodology" course/workshop/training	The Faculty of Engineering already offers relevant courses for faculty members online, virtually and in person and makes the recordings available (See here) as part of the Fireball Academy. LiCS is running a four days of workshops this summer for CAS graduate students focused on how to perform research in Computer Science and Software Engineering. Given the positive response to the day long courses on a variety of topics offered so far, we hope to make this an annual event. The department will also explore Mitacs training courses and make faculty and students aware of these and other external resources.	Assoc. Chair Research + Grad Chair together with the Faculty	Summer 2022/Ongoing
Admissions			
Rationalize admissions process and develop recruiting strategy	Differentiate M.Sc vs. M.A.Sc more clearly on admission webpages (RA/TA/fellowship) - Improve web presence	Grad Chair	2023

	- Via correspondence with applicants and incoming students. 2) Recruitment strategy to increase domestic applicants and acceptances. 3) Form admissions task force to review the above.		
Slate Training	Faculty training materials, provide spreadsheet of eligible candidates as temporary workaround until Phase II deployed.	Grad. Assistant	Winter/Spring 2023
Curriculum			
Publicize grad studies, research to u/g	Explore a study-term research program in addition to NSERC USRA	Associate Chair Research, Associate Chair Undergraduate, Undergraduate Curriculum committees	2023
Enrich course offerings	Publicize course offerings early. As new hires join, breadth and depth of courses should improve. In the meantime, explore cross-listings with other departments.	Grad. Chair	2024
Teaching and Assessment			
Breadth and Communication Skills for M.Eng.	Discuss with GCPC whether M.Eng courses should satisfy breadth requirements similar to M.Sc/M.A.Sc. Consider an oral presentation requirement for M.Eng via poster/demo showcase or their study project.	Grad. Chair	2023-2024
TA allotment		Chair to negotiate w/ Nancy	
Resources			
With high student-faculty ratios, improve TA training	Will ask the Associate Dean of Graduate Studies to include	Associate Chair Graduate	September 2022

to work on occasional difficult cases to reduce stress.	new topics in the TA training focusing on practical issues of: academic integrity, accommodation, handling difficult students.		
The current hiring should be strategic and opportunistic to hire strong candidates from non-priority areas while balancing long term growth plan.	This is the process that we have followed thus far in our hiring process, and we have been very successful at balancing departmental teaching needs with opportunistic hiring. Hiring strategy is discussed and approved at Departmental meetings on a regular basis to provide and opportunity for feedback from all members of the Department.	Chair/Hiring committee	Ongoing
Quality			
Funding Model	Close the RA funding gap b.w. international vs. domestic students. Institute incentives to accept more PhD students	Grad Chair + Chair + Assoc. Dean + Nancy	Fall 2022
Explore high attrition rates in SE programs	Investigate SE Master's students attrition rate causes	Grad Chair	2023/2024

Faculty Response

The Engineering faculty has read the reviewers' recommendations as well as the reply by the department to the IQAP review of graduate programs in Computing and Software. The review was timely due to the major reorganization of the department to accommodate enlargement of the undergraduate program, which will similarly spur growth in graduate numbers. The department's growth is being charted by its strong leadership team who will undoubtedly find the guidance offered by the review team invaluable over the next three years of change.

The Computing and Software department and Dean's Office are keenly focused on what these programs will become after this expansion, with much attention at the moment on increasing the size of its faculty while keeping EDI at the forefront of our decisions. The reviewers' comments and responses of the department seem to align nicely with our concerns. The implementation of an internal committee, in the face of such rapid growth in faculty and students, seems timely and the Dean's Office will offer support as needed. The insistence by the reviewers to re-establish a department specific industrial advisory

board does not seem well justified and could conflict with the Dean's strategic plans, so we will not be requiring it but will support the department if they feel it will benefit their faculty and programs. Space will forever be a problem and the department has notably mentioned a new building that could provide the recommended space for students, though we will endeavour to review our space in the meantime and update all of our departments if we see options to alter the use of current space.

There are a lot of points related to admissions and curricular issues that will require considerable discussions beyond the department. We will work with the department and Graduate Studies to make these improvements over the next year or two. The funding models of graduate students is however not a matter related to academics and is not – and should never – be brought up in an IQAP report. The reviewers were instructed this matter was off-limits by the Dean of Graduate Studies and chose to ignore this fact. The IQAP system should not be used as a tool to negotiate non-academic matters that belong instead with internal Faculty discussions.

Quality Assurance Committee Recommendation

McMaster's Quality Assurance Committee (QAC) reviewed the above documentation, and the Committee recommends that the Computing and Software Graduate programs should follow the regular course of action with an 18-month progress report and a subsequent full external cyclical review to be conducted 7 years after the start of the last review.