Office of the Provost & Vice President Academic
Nipissing University
100 College Drive, Box 5002

FINAL ASSESSMENT REPORT

PROGRAM UNDER REVIEW

PROGRAM	SENATE APPROVAL DATE	PREPARED BY
Computer Science	July 14, 2023	Provost and Vice-President

A. SUMMARY OF REVIEW PROCESS & LISTING OF PROGRAMS UNDER REVIEW

SELF-STUDY REVIEW TIMELINE	DATE
1. Self-Study Presented to AQAPC	Apr. 22, 2022
2. Site Visit Conducted	Nov. 16 – 17, 2022
3. Reviewer's Report Received	Feb. 1, 2023
4. Internal Reviewers Response Received	March 18, 2023
5. Dean's Response Received	April 25, 2023

The members of the review committee were:
- Dr. Simon Xu, Algoma University
- Dr. Minglun Gong, Guelph University

The academic programs offered by the Department which were examined as part of the review included:

- **Bachelor of Arts**
- **Bachelor of Science**

This review was conducted under the terms and conditions of the IQAP re-ratified and approved by the Quality Council on April 26, 2019.

B. PROGRAM STRENGTHS

Nipissing offers a general program in Computer Science which includes the core topics such as Programming, Data Structure, Software Engineering, Discrete Mathematics, Database, and Computer Organization. In addition to the solid foundation, the computer science program has developed a niche area in game design and development. Recently, the university has engaged in recruitment of international students from India and the number of applications for computer science programs has been doubled. All those indicate that the program is consistent with Nipissing's mission and academic plan.

<u>**Recruitment**</u>

External Reviewers Recommendation #1: *Since the BA in Computer Science has historically low enrolment with only 3-4 students every year, it is recommended two programs (BA and BSC) be combined into one program, so the program name and course selection are more appealing to students.*

Unit's Response: Partially agree.

We agree to develop a new program called Bachelor of Computer Science. If the university supports this initiative, the computer science program can submit the proposal as early as possible.

However, cancelling the BA program is not a good choice. The current BA and BSc programs have been offered for over 20 years. The BA program does not consume any extra resources of the university. The current two programs can offer opportunities for those students who prefer to skip the science courses of the BSc requirements. Offering these two programs at the same time actually brings in benefits for the small computer science program, such as the FTEs.

This recommendation also reminds us of our intention to revise the core courses of the BA program. We note that such a revision may not result in higher enrolments in our courses; in fact, it may even lower the enrolments in some courses.

Dean's Response: I agree with the External Reviewers' recommendation to combine the BA and BSc programs to a single BSc degree. However, by offering the BA Computer Science program students can combine with other BA programs in Arts and Science. The only difference between the BA and BSc programs is the requirement to complete 12 credits from the following list of science courses (BIOL-1006, BIOL-1007, CHEM-1006, CHEM-1007, PHYS-1006, PHYS-1007). I recommend removing prescribed list of science courses and allow BSc Computer Science students to take any 12 credits of science courses. This will allow Computer Science students the opportunity to create minors or majors in any science degree program - Biology, Data Science, Environmental Science, Geography, Liberal Science, Math, or Psychology. This would be consistent with other Computer Science programs in the province.

Provost's Response: The low enrolment is a significant challenge. I support the Dean's recommendations to remove the prescribed list of science courses, hence allowing BSc Comp Sci students to choose a workable major or minor from other science degree programs.

External Reviewers Recommendation #2: *It is recommended that the department work closely with the admission team and registrar's office to reach out to domestic and international students and to increase the conversion rate.*

Unit's Response: Yes, we agree with this recommendation. The computer science will support the outreach efforts of the admission team and the Registrar's Office.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. The Provost and Vice President Academic has approved a Letter of Intent to develop a Post-baccalaureate Diploma in AI and Machine Learning Applications. We are in the process of developing the 2-Year PBD program for Senate approval. We aim to recruit international students for an intake in January 2024. A curriculum review and updating courses will help with recruiting domestic and international students. See response below regarding a curriculum update.

Provost's Response: The Post Baccalaureate Diploma in Artificial Intelligence and Machine Learning will be recommended to ACC at the June 12th, 2023, meeting. If approved, it will go to the June 26th Senate meeting. If approved there, recruitment can begin for either the January 2024 or September 2024 intake.

External Reviewers Recommendation #3: *It is recommended that department actively endeavor to create individual and pathway transfer articulation agreements with Ontario colleges.*

Unit's Response: Yes, we agree with this recommendation. We shall continue to work with the Registrar's Office on these initiatives.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. There are two pathway agreements with Humber College – Computer Engineering Technology and Electromechanical Engineering Technology. However, these programs have not recruited many students. We will work with the Pathway Development Coordinator to explore new Pathway to Degree programs.

Provost's Response: We will work with the Office of the Registrar to promote current pathways and investigate the possibility of increasing these options with our Pathway Development Coordinator.

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Curriculum

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External Reviewers Recommendation #4: *It is recommended that the department revisit undergraduate curriculum with the goal of better supporting students to progress through and to improve the retention rate. Potential changes to be considered include creating an Introduction to Computer Science II course and adding a second Data Structures course.*

Unit's Response: We do not disagree. Although C++ Programming (COSC 1567) currently functions as an Introduction to Computer Science II course, another course may be proposed and offered, in addition to COSC 1567, to facilitate the transition to data structures/algorithms and to more advanced third-year courses. The department currently has a Data Structures II course (COSC 2007) on the curriculum. However, it has often been cancelled or not offered due to enrollment. The courses should also be renamed as Data Structures and Algorithms I and II to better reflect their content.

Dean's Response: I agree with the External Reviewers' recommendation. The retention rate from year 1 to year 2 is low. The reviewers recommend developing more foundational courses in the first year to help the transition to year 2. They suggested this approach has been successful at several other universities in the province. In addition to Computer Science I, II, Data Structures I, II, they recommend adding a computing skills course in 1st year.

Provost's Response: I support the External Reviewers' and the Dean's suggestions. Student retention is key to the university's mission and stability. The program needs to revise their courses to meet the needs of students and hence support student retention.

External Reviewers Recommendation #5: *It is recommended that a fourth-year course in Algorithms be added into the core curriculum of CS programs so that there are two required fourth courses and it is in line with CS programs in other universities.*

Unit's Response: We agree that such a course is foundational for computer science. However, assurances are needed from the administration to ensure that the course is offered even with a low fourth-year enrollment. A new proposal for the fourth-year algorithms course is forthcoming from the Computer Science program.

Dean's Response: I agree with the reviewers' recommendation and IRC response to add a required 4th year Algorithms course to the curriculum requirements. Recruiting international students through a Post-Baccalaureate Diploma and a curriculum review will help increase enrollments from 1st year to 4th year, negating the need lower the threshold for low-enrollment courses.

Provost's Response: The institution cannot offer assurances that courses with low enrolment will be offered. I am hopeful that following up on previous recommendations will result in increased retention, and that the enrolment of Post Bac students will assist in ensuring that the courses will have the minimum enrolment required to offer them.

External Reviewers Recommendation #6: *It is recommended that the contents for some of the courses such as COSC2116 and COSC3657 be modernized, and the learning outcomes of some courses be updated.*

Unit's Response: We agree. COSC 2116, COSC 3657, and perhaps others need to be greatly revised, and the academic calendar course descriptions will be updated to reflect these revisions.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. The Computer Science program requires a curriculum review to ensure that courses are up to date with revised learning outcomes that align with the degree level expectations.

Provost's Response: The unit needs to undertake a curriculum review. This could result in major modifications or minor modifications.

External Reviewers Recommendation #7: *It is recommended that the department consider making either COSC 1901 or COSC 1902 available to Computer Science students as an elective, as well as making one or both as mandatory courses on computer literacy for students from other disciplines.*

Unit's Response: We agree. The department will soon submit a new minor revision proposal for the BA and BSc program. The content of these courses will also be revised to correspond with the Computer Science program.

Dean's Response: I agree with the reviewers' recommendation and IRC response. Adding either COSC-1901 or 1902 to the Computer Science 1st year requirements will help students transition from 1st year to 2nd year.

Provost's Response: Adding either COSC-1901 or 1902 to the Computer Science 1st year requirements will help students transition from 1st year to 2nd year and should be part of the larger curriculum review.

External Reviewers Recommendation #8: *It is recommended to lower the threshold for minimum number of students in a course from 15 to 10, so that more courses can be offered.*

Unit's Response: We agree. However, given the program's current enrollment situation, the threshold may need to be even lower than 10 to help to ensure program development.

Dean's Response: I need to be mindful of the Collective Agreement to ensure that faculty workloads across the academic units is equal. I am hopeful that by implementing the reviewers' recommendations – creating a Post-baccalaureate Diploma, updating courses and the learning outcomes, revising the core curriculum, and developing a co-op option – that low enrollment courses will not be an issue in the very near future.

Provost's Response: The current enrolment requirements are consistent across programs and faculties and are in place to support the university's sustainability. I do not anticipate changes.

External Reviewers Recommendation #9: *It is recommended that a co-op program and one certificate program be developed based on the expertise of the faculty and demand of the market.*

Unit's Response: We agree. The co-op program needs to be established as soon as possible**.**

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. The previous Dean had made agreements with local business to guarantee co-op placements in North Bay and elsewhere. The Dean's office

recently added a staff member to develop a co-op program in Arts and Science. We will continue working towards creating a co-op program that can serve Computer Science students and other programs in Arts and Sciences.

Provost's Response: I agree with the Dean's response.

Resources

External Reviewers Recommendation #10: *It is recommended that the replacement position hiring in Computer Science be provided.*

Unit's Response: We agree. The budget for the replacement needs to be formalized as soon as possible.

Dean's Response: The Chair of Computer Science and Mathematics and the Dean's office are working with local industry partners to create an Industrial Research Chair position in Artificial Intelligence and Machine Learning. However, I note that requests for faculty positions are subject to budgetary processes and approvals within the Faculty and the University as a whole.

Provost's Response: Work continues to create an Industrial Research Chair position in Artificial Intelligence and Machine Learning.

External Reviewers Recommendation #11: *Considering the rapid growth of Computer Science departments in other Ontario universities, it is recommended that special funding be provided by the administration to support the department's growth initiatives.*

Unit's Response: We agree. Computer Science is an attractive program. Therefore, investing in the Computer Science program is cost-effective for the university, and is especially important for attracting international students.

Dean's Response: I agree that Computer Science programs across the province are growing rapidly at other Ontario universities. I hope that by implementing the reviewers' recommendations that Nipissing's Computer Science program follows the same trend. However, all funding requests are subject to budgetary processes and approvals within the Faculty and the University as a whole.

Provost's Response: At this time, special funding to support growth initiatives is not available.

Outreach

External Reviewers Recommendation #12: *It is recommended that the university/the department Improve engagement with alumni, preferably through social media as an effective and economical approach.*

Unit's Response: Yes. We agree. The computer science program is ready to help conduct such events.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. The university recently added a Manager of Digital Media and Strategies to develop a more comprehensive and targeted marketing strategy for the university. Also, the Dean's office can help support promoting Computer Science initiatives through social media to increase the profile of the program externally.

Provost's Response: With the Manager of Digital Media Strategies and the assistance of the Dean's office, work will continue to engage with alumni.

External Reviewers Recommendation #13: *It is recommended that one faculty retreat be held by the department every two or three years to engage stakeholders.*

Unit's Response: We agree that faculty interaction with stakeholders, both within and beyond the North Bay area, is important.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. However, I would recommend that the members of the computer science program hold an annual retreat to consider how the proposed curriculum changes are meeting the needs of students and improving the transition from year 1 through year 4.

Provost's Response: I agree with the Dean's recommendation that the members of the computer science program hold an annual retreat to consider how the proposed curriculum changes are meeting the needs of students and improving the transition from year 1 through year 4.

External Reviewers Recommendation #14: *It is recommended the department make connections with the local IT industry to prepare for the Coop program.*

Unit's Response: We agree. We had previously established an advisory committee that included the Department Chair, Computer Science faculty, and leaders of the local industry. We may reactivate this committee as required. Additionally, due to the new remote/distance paradigm in many computer-related professions, the scope of faculty interaction with government, industry, and business can now extend beyond the North Bay area.

Dean's Response: I agree with the External Reviewers' recommendation and IRC response. As mentioned above, the previous Dean of Arts and Science has made connections with the tech industry in North Bay and surrounding areas to secure placements for computer science and other Arts and Science students. I will continue to network with these industries to ensure that we can meet the demand of growing enrollment in computer science.

Provost's Response: I agree that the Dean should continue to network with local IT industries to ensure opportunities for co-op and collaboration with the Computer Science program.

D.   IMPLEMENTATION PLAN

Below are the recommendations that require specific action as a result of the Review, along with the identification of the position or unit responsible for the action in question. Notwithstanding the position or unit identified as the being responsible for specific recommendations, the Dean of the Faculty has the overall responsibility for ensuring that the recommended actions are undertaken.

RECOMMENDATIONS BY THE PROVOST	RESPONSIBLE MEMBER/UNIT	PROJECTED COMPLETION
Based on Recommendation #1, I support the Dean's recommendations to remove the prescribed list of science courses and allow BSc Comp Sci students to choose a workable major or minor from other science degree programs.	Chair and faculty with recommendation to Dean and curriculum approval process	Fall 2023
Based on Recommendation #2, the Post Baccalaureate Diploma in Artificial Intelligence and Machine Learning will be recommended to ACC at the June 12th, 2023, meeting. If approved, it will go to the June 26th Senate meeting. If approved there, recruitment can begin for either the January 2024 or September 2024 intake.	After approval, Dean communicates to RO	First intake January 2024

Based on Recommendation #3, approval for additional college pathways will go to the June 2023 Senate meeting.	Recommendations for additional pathways go the June 2023 Senate meeting	First intakes January 2024
Based on Recommendations #4, 5, 6, 7, and 13, the department should undertake a curriculum review with the goal of better supporting students' progression and to improve the retention rate. Potential changes to be considered include creating an Introduction to Computer Science II course, adding a second Data Structures course, and adding either COSC-1901 or 1902 to the Computer Science 1st year requirements to help students transition from 1st year to 2nd year.	Department members, and then follow the regular curriculum approval process	Fall 2023
Based on Recommendation #10, work continues to create an Industrial Research Chair position in Artificial Intelligence and Machine Learning.	Dean with city and local businesses	Hire for September 2024
Based on Recommendation #14, the Dean should continue to network with local IT industries to ensure opportunities for co-op and collaboration with the Computer Science program.	Dean and co-op coordinator A/S Office	Ongoing