REPORT OF THE ACADEMIC PLANNING COMMITTEE
TO THE REGULAR June 2018 SENATE

FOR INFORMATION

QUALITY ASSURANCE - CYCLICAL PROGRAM REVIEW OF LAURENTIAN UNIVERSITY'S MATHEMATICS AND COMPUTER SCIENCE UNDERGRADUATE PROGRAM FINAL ASSESSMENT REPORT & IMPLEMENTATION PLAN

In accordance with the Laurentian University's Institutional Quality Assurance Process (IQAP), the Final Assessment Report has been prepared to provide a synthesis of the external evaluation and Laurentian's response and action plan. This report identifies the significant strengths of the program, opportunities for program improvement and enhancement, and 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; and who will be responsible for providing any resources made necessary by those recommendations. The report also lists 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.

SUMMARY OF THE CYCLICAL PROGRAM REVIEW OF THE UNDERGRADUATE PROGRAM IN MATHEMATICS AND COMPUTER SCIENCE (E and F)

On September 23, 2016, the department submitted its self-study to the Office of Vice-President Academic and Provost of Laurentian University.

The self-study presented an overview of the program and then reviewed the program's self-perception of the faculty, physical and financial resources, students, and program outcomes. It concluded with an overall assessment of the program's strengths and weaknesses. Appendices 1 – 8 provide the following information: the faculty and their teaching loads; both library and physical resources; courses offered with enrolments and graduates over the past five years; program regulations and course descriptions from the university calendar; course outlines and methods of determining grades and exams; student evaluations; current student comments and letters from former students; and CVs of the faculty.

On February 27 and 28, 2017, after reviewing the self-study, the Review Team conducted a site visit. The external reviewer was Dr. Jean-Pierre Dussault, Professor in the Department of Computer Science at the Université de Sherbrooke. In addition, the team consisted of two Laurentian professors, Dr. François Caron from the School of the Environment and Dr. Matthias Takouda from the department of Finance and Operations in the Faculty of Management. Finally, the team included two students in the program, Emmalie Tomini and Benjamin Anderson-Sackaney.

During the visit, the external reviewers met with the Vice-President Academic and Provost, as well as with the Dean of Science, Engineering and Architecture, and the AVP, Francophone Affairs. The entire review team also met with the Chair and faculty members of the department and with a group of students. Additionally, the review team met with the librarian supporting the program. The reviewers also toured some of the classrooms and computer laboratories.

On March 24, 2017, the external reviewer submitted his report. It was very succinctly written and provided a concise overview of his evaluation. In the report he commented "The department offers programs in both in mathematics and in computer science. The department offers bilingual programs. The department also offers courses for external programs. I am impressed that all of this supported by only 15 full-time faculty members." He did also note that since the self-study was dated 2015, some of the information contained in his report may be outdated. In addition, he noted that:

- The mathematics programs are well appreciated.
- The new specialized programs, Game development, Web Data management, Actuarial science are very well received and appreciated by the students, and are a good way to make it distinct from other similar programs.
- The coop option is another originality that should prove attractive.
- The department is providing quality courses and degrees.

On November 2, 2017 the Office of the Provost received the response of the Unit and on December 7, 2017 the Office of the Provost received the response from Dr. Osman Abou-Rabia, Dean of Science, Engineering and Architecture to the external reviewer's report. Both responses form the basis of what follows:

SUMMARY OF THE REVIEW TEAM'S RECOMMENDATIONS (R) THE DEPARTMENT'S (U) RESPONSES AS WELL AS THOSE OF THE DEAN OF SCIENCE, ENGINEERING AND ARCHITECTURE (D)

The following recommendations are dealt with in the order that they were presented in the external reviewers' report. The Dean's response had listed the recommendations in order of priority which will be reflected in the implementation plan.

R1: Hire faculty members to support the new specializations Programs.

U1: Obviously, we agree with this main recommendation. As the external reviewer, we think that those new programs will deliver on their promises. More faculty members are necessary to support the new programs. It will also reduce the overload for the current faculty members and increase the enrollment and the graduation rates.

D1: This should stem from the self-assessment and program revision of the programs. Also, new hires are requested as part of the new proposed specializations in Security.

R2: Investigate in depth the critical situation of low graduation in computer science programs. Most probably the overload faculty members in CS are part of the causes, so following my first recommendation should contribute to alleviate this low graduation issue.

U2: The faculty members of the department are already aware of this low graduation issue. We are actually exploring ideas to correct it by introducing Labs and Tutorials for some courses in computer science.

D2: I believe that the previous point (self-critical evaluation of computer science courses) has a lot to do with this problem. I also believe that the present status of the CO-OP program in CS is not helping with retention. The CO-OP program needs to be overhauled in order to reach its full potential.

R3: **Consider making homogeneous sections for the Calculus I course. Also ensure that the pre-requisites are indeed enforced for students coming out-department programs.**

U3: This year we had proposed two sections of calculus sections in order to avoid class with more than 370 students. We also had introduced during the last two years online assignments. The next step will be to introduce homogeneous sections. For example, we can have a section for mathematics and engineering students and another for the rest.

D3: We have already split MATH 1036 into 2 sections in order to improve the teaching and learning by having a smaller size sections. Converting the second section to a homogenous section for life science students can definitely improve student retention.

R4: Consider adding a Calculus course in the computer science programs.

U4: We agree especially if we want to look at the computer science program as a feeder for our MSc in Computational sciences. Having homogeneous sections for the Calculus I as raised by Recommendation 3 might open an accessible section for Computer Science students. The Computer Science curriculum committee will meet in order to discuss the logistics of this change.

D4: This should be part of the program's self-assessment.

R5: Include both COSC 4117 (Artificial Intelligence) and COSC 4306 (Computer Graphics) in the Game Design Specialization.

U5: We agree in principle with this recommendation and the Computer Science curriculum committee will meet in order to discuss the logistics of this change.

D5: This should be part of the program's self-assessment.

R6: Revise the computer science laboratories to enhance availability (private labs for the M&CS Department).

U6: We used to have that. We will try to reinstall that. Labs in F441 and F443 have been renovated for the department.

D6: I will pursue this recommendation as it will help both the students and the Department.

R7: Perform a self-critical evaluation for computer science courses to improve outdated contents. Request the students' input, they use google and other modern web resources to support their complaints about some outdated contents.

U7: The department will take into consideration suggestions by the students regarding the outdated contents. However, the faculty members in the department are generally diligent about the course contents.

D7: I totally agree with this recommendation. The Department needs to survey programs offered at other institutions and make appropriate revisions to their programs in order to ensure that the content of courses and program structures are up to date and include the right courses that new graduates need in order to face the employment challenges in the fast-changing field of Computer Science.

R8: Revise misleading courses titles (course 1 without a 2 versions).

U8: The presence of some courses labeled by 1 was mainly due to an intention of introducing a following course labeled 2. The calendar descriptions will be revised to clean the course titles.

D8: This should be part of the program's self-assessment.

R9: Pursue the search for solutions to offer a wider choice of elective specialty courses in the mathematics program while also satisfying the needs of French speaking students.

U9: The number of elective courses is justified on the basis of the faculty strength and the number of students. The Department is exploring the idea of having more attractive mathematics program offered in French.

D9: This should be part of the program's self-assessment.

R10: Consider creating a bilingual computer science program.

U10: This has been on the radar for a long time although the focus had been on a separate French language computer science. It might be interesting to follow the model of

Engineering and discuss with the Bharti School of Engineering to find out how this is going.

D10: This recommendation is worth pursuing following the success of the bilingual engineering programs. We can at least start this program by introducing COSC 1046 in French and include the discrete mathematics courses and a specified number of elective courses in French.

ACAPLAN'S RESPONSE

ACAPLAN endorses the recommendations of the Review Team and notes that none of the recommendations were either redundant or outside of their current scope of focus. What follows is the proposed Implementation Plan with the recommendations listed in order of importance as indicated by the Dean of Science, Engineering and Architecture in his response:

LAURENTIAN QUALITY ASSURANCE IMPLEMENTATION PLAN FOR THE UNDERGRADUATE PROGRAM in MATHEMATICS AND COMPUTER SCIENCE

Recommendation	Proposed Follow-up	Responsibility for Leading Follow-up	Timeline
R7: Perform a self-critical evaluation for computer science courses to improve outdated contents. **(i) R5: Include both COSC 4117 (Artificial Intelligence) and COSC 4306 (Computer Graphics) m the Game Design Specialization.** **(ii) R9: Pursue the search for solutions to offer a wider choice of elective specialty courses in the mathematics program.** **(iii) R4: Consider adding a Calculus course in the**	Perform a self-critical evaluation of computer science courses and program structures. This evaluation should also address the recommendations listed in (i) – (iv).	Chair working with Computer Science Faculty	September 2018

computer science programs. **(iv) R8: Revise misleading courses titles (course 1 without a 2 versions).**			
R2: Investigate in depth the critical situation of low graduation in computer science programs.	Identify the factors leading to low graduation rates in computer science programs	Chair working with Computer Science Faculty members, Office of Registrar, Liaison	September 2018
R6: Revise the computer science laboratories to enhance availability (private labs for the M&CS Department).	Creating a dedicated computer laboratory space	Chair working with Dean of Science, Engineering and Architecture	September 2018
R10: Consider creating a bilingual computer science program.	Creating a bilingual computer science program with courses already in existence	Chair working with Computer Science faculty members an Dean of Science, Engineering and Architecture	January 2019
R1: Hire faculty members to support the new specializations Programs.	Identify knowledge gaps to be filled with new faculty members for new program specializations	Chair working with Dean of Science, Engineering and Architecture	January 2019
R3: Consider making homogeneous sections for the Calculus I course.	Create a dedicated section for students in specific Science and Engineering programs Consider creating an applied math course that could serve as a service course for other programs	Chair working with Dean of Science, Engineering and Architecture	September 2018

The Dean of Science, Engineering and Architecture shall be responsible for monitoring the implementation plan. The details of progress made shall be presented in the Dean's Annual Report and filed with the Vice-President Academic and Provost. The executive Summary and the monitoring reports will be posted on Laurentian University's web site.

CONCLUSION

The Mathematics and Computer Science Program (E and F) is approved to continue and it will be reviewed in the fall of 2024.