

# FINAL ASSESSMENT REPORT

## PROGRAM UNDER REVIEW

PROGRAM	SENATE APPROVAL DATE	PREPARED BY
MSc. Mathematics	September 13, 2019	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	Jan. 8, 2019
2. Site Visit Conducted	Feb. 12-13, 2019
3. Reviewer's Report Received	Mar. 5, 2019
4. Internal Reviewers Response Received	Apr. 15, 2019
5. Dean's Response Received	Apr. 17, 2019

### The members of the review committee were:

- Dr. Natalya Brown (Internal)
- Dr. Douglas Farenick, University of Regina (External)
- Dr. Walter Tholen, York University (External)

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

- M.Sc. in Mathematics

This review was conducted under the terms and conditions of the IQAP approved by Senate on May 17, 2013.

## B. PROGRAM STRENGTHS

**External Reviewers:** *Nipissing University offers a high-quality M.Sc. program in Mathematics, with a specialization in topology and functional analysis, which reflects the research strength in these areas by the majority of the members of the Department of Mathematics and Computer Science. Graduates of the program show a high level of satisfaction with the education they received.*

## C. OPPORTUNITIES FOR IMPROVEMENT AND ENHANCEMENT

***External Reviewers Recommendation #1: Nipissing University must develop a clear vision and plan for its graduate programs, which provides general guidance to program leaders, emboldens their planning efforts at the unit level, and fosters the cooperation between units within NU and with neighboring institutions, for joint program development and support.***

**Unit's Response:** We strongly support the development of an institutional strategy for graduate studies, including as a crucial element the recruitment and support of international students. Given the proven record of the Department members in institution-wide service, we expect to be participating members of all bodies that will discuss, develop, articulate, and enact such a strategy and vision for Nipissing University.

**Dean's Response:** I agree that there is a need for a more strategically defined vision and plan for Nipissing University's graduate studies programs. The first step in this direction was the recently approved Strategic Research Plan (spearheaded by the Dean of Graduate Studies and Research). As the Dean Interim, I have initiated discussions with Graduate Coordinators and the faculty to develop an Arts and Science graduate studies plan that aligns with the NU Strategic Plan, the Institutional Academic Plan, and the Strategic Research Plan.

It is important to emphasize, however, that while the graduate studies program in Math was one of the first at Nipissing University, the supports for running the program at its full capacity have been lacking. Similar to other GS programs at Nipissing, outdated recruitment and marketing strategies have weakened what is, at its core, an intellectually strong and unique program that differentiates Nipissing from other Ontario universities with MSc programs in Math. Nonetheless, the recent restructuring in the Registrar Office and the Office of External Relations has improved Nipissing's application numbers dramatically and hence there is a great potential for improvement in this area.

Furthermore, from the decanal perspective, it is crucial that a clear recruitment and enrolment strategy is needed to best support and further market the program through community outreach, open house events, and other initiatives. From my perspective, boosting the recruitment for international students and better advertising of the program are the first key steps to bolstering the program.

**Provost's Response:** Annual Academic Plan for 2019-2020 includes an initiative to create a Strategic Plan for Graduate Studies (initiative IIIB3).

***External Reviewers Recommendation# 2: Nipissing University should engage a research firm to more fully examine student interests and local economic needs as they relate to mathematics and computer science to ensure that future academic programming aligns with the needs and interests of future students.***

**Unit's Response:** While we understand that this recommendation might not be easy to implement in times of financial difficulties for the University, we agree that the data gathered in such studies in the recent past should be used to inform the institutional recruitment efforts and program development. We would like to acknowledge that our current initiatives in Data Science, Mathematics and Economics, and Statistics are informed by studies of the local, provincial, and continent-wide trends. We expect that these program proposals will have the support of the institution and will be implemented in a timely fashion. It is also important to point out that most of our students are not local students. The paper "Proximity, Prosperity, and Participation: Examining Access to Postsecondary Education among Youth in Canada's Provincial North" co-authored by Dr. David Zarifa and his colleagues Drs. Darcy Hango and Roger Pizarro Milian, needs to be noted in terms of explaining the challenges of attracting students from our region.

**Dean's Response:** I agree that a survey of students' graduate studies academic interests and foci can be a useful tool in bolstering the program. However, graduate studies programs are based on the scholarly expertise of the faculty members who contribute to these programs. Balancing recruitment of domestic and international students is therefore essential in this context. Once again, without a proper marketing strategy in place, it is difficult to assess the

program's enrolment capabilities. A case in point is the Pure Mathematics Program at the University of Waterloo—even a quick glance at the program website highlights future career opportunities for students pursuing topology as their area of expertise, for example.

**Provost's Response:** I agree with the Dean. I would also draw your attention to the Academica Survey carried out recently, and the ongoing SEM work led by the Registrar's Office. I encourage the department to actively contribute to this work.

**External Reviewers Recommendation #3:** *All faculty members of the Department of Mathematics and Computer Science must work cooperatively in developing a more flexible and comprehensive course structure in mathematics. At the Master's level, not only the teaching of courses, but also the supervision of projects or theses outside the faculty members' areas of research expertise must be regarded as the norm, not the exception.*

**Unit's Response:** We agree with this recommendation. It also needs to be noted that the MSc in Mathematics is the result of establishing research strength in Topology and Analysis. Without it, we would not have the program. We would like to acknowledge that even a cursory glimpse over the topics of our graduates' Major Research Papers and Theses, shows that our faculty members have departed from their specific area(s) of expertise and have routinely supervised projects in a wide variety of topics in Pure, Applied and Computational Mathematics. The current graduate course range is comprehensive, and the Department is currently working on a Letter of Intent for Major Modification, considering changes to the program structure and core course requirements aimed at increasing the flexibility of the program. Now we are in a position to expand our program because of having established research strength in Optimization and Computational Physics in addition to our traditional areas of strength.

**Dean's Response:** Currently, most of the faculty teaching in the program supervise theses that do not always fall under their area of expertise. As reflected in the department's response, the department is open to collaboration.

**Provost's Response:** This becomes even more important as the Data Science programme starts. This new undergraduate programme brings potentially a cohort of graduate students with a slightly different interest.

**External Reviewers Recommendation #4:** *In student recruitment, whether internal or external, including international, the virtues of a phenomenal student-per-faculty ratio at Nipissing University must be clearly articulated, and the program must brand itself accordingly in all fora, especially on its web pages and on social media platforms used by current and future students.*

**Unit's Response:** We agree with this recommendation. It is a longstanding feeling of the Department that our graduate program is not marketed adequately by the institution. The institutional process of updating web content has been an issue. We do not expect to be able to adequately market the program ourselves in this environment. It would be beneficial for us to have more or full control over the content of all departmental web space in order to make ongoing updates. The recent developments in terms of faculty having control over the web-content are positive, and we are hopeful that we can address this issue more fully.

**Dean's Response:** I agree with the reviewers. Please see my comments above.

**Provost's Response:** Small classrooms have their place as an explicitly considered pedagogical mechanism. However, small classrooms in undergraduate education can also be an highly intimidating learning environment and not appropriate. Further, rhetoric around small classrooms which have resulted from declining enrollments have led to some serious workload inequities among faculty at NU. The Registrar is leading a SEM planning exercise and it is vital that the School engage in enrollment planning as part of its annual academic planning exercise which then is also connected to the SEM.

**External Reviewers Recommendation#5:** *The unit and the Faculty of Graduate Studies must follow up on Nipissing University's goal to "Improve competitiveness in recruiting graduate students by enhancing financial packages" (Strategic Research Plan 2019-2024, p. 13). Concretely, a temporary equalization of international and domestic fees should be considered.*

**Unit's Response:** We fully agree with this recommendation. In the Self-Study, we documented the fact that students choose to go to other universities for graduate studies based on the financial package being offered. All of our discussions with the reviewers, with colleagues, and with collaborators at other institutions, nationally and internationally, indicate that our financial package for incoming graduate students is far behind the provincial and national norms, and far from what an applicant with the required qualification would expect; therefore, it does not merely repel prospective students, but also damages the reputation of the Department. Maybe this is the area where the University has to do research (by hiring a firm, or otherwise), in order to align its graduate funding strategy with those of the regional and provincial competitors.

**Dean's Response:** I agree with the reviewers. Our financial packages for Arts and Science graduate studies programs are not competitive with other universities and result in losing interested students to other universities. The inadequate funding jeopardizes Arts and Science graduate programs. The same applies to packages for international students. To improve these areas, further consultation with the Offices of the Provost and the Dean of Graduate Studies and Research will follow.

**Provost's Response:** The Strategic Plan for Graduate Studies will need to address this. It is, in my opinion, premature to reduce tuition fees before we have also looked at other competition mechanisms such as scholarships, and before we have developed and implemented a strategy for graduate recruitment.

**External Reviewers Recommendation #6:** *In taking advantage of complementary strengths in the mathematical sciences, the possibility of cooperation with Laurentian University in support of a broad-based program should be actively explored by the unit, with the support of the institution.*

**Unit's Response:** Any such discussion has to be initiated above the departmental level. The Department expects to be represented in the subsequent stages of such discussion(s), and will contribute to such an effort. We acknowledge that establishing such partnerships is a viable option, and one that the department is willing to investigate.

**Dean's Response:** Further discussion with the department will be essential to considering a joint collaborative program with Laurentian University. In consultation with the department, I see opportunities for collaboration that include other Near North Universities (including Lakehead U) but also GTA universities like the University of Waterloo, UOIT, and Guelph that have engineering programs and could provide opportunities for expansion in other areas. Given the department faculty's diverse cultural backgrounds and connections, there are a lot of untapped-for-opportunities to explore connections with international universities and researchers that the department is connected to. Offering an online component might further enhance the program's enrolments and opportunities.

**Provost's Response:** Agree with Dean

**External Reviewers Recommendations#7:** *Within the institution, the department should explore and pursue opportunities for playing a supportive role in other existing or planned graduate programs at Nipissing University -- mathematics education and environmental science are two possibilities.*

**Unit's Response:** The Department is open to discussions and currently actively collaborates with other departments. Members of the Department supervise students and teach courses in other graduate programs. Our courses are open to students from other programs. However, caution should be exercised. Students from other graduate programs should have the academic background necessary to take advanced courses in Mathematics. Moreover, given the research capacity and strength of the faculty members of the Department and desire/need to supervise graduate students in order to obtain grants, the reciprocity in such collaborative efforts among the academic units will be essential.

**Dean's Response:** As outlined in the departmental response, the faculty members participate in other graduate programs such as Environmental Science, Sociology, and Kinesiology, not to mention the Master's in Education and the Ph.D. in Education programs. The lack of resources and the challenges of staffing the undergraduate program however pose further challenges that will need to be addressed more globally as these challenges affect other Arts and Science graduate studies programs as well.

**Provost's Response:** I strongly support this recommendation to support other programmes at NU. The shortage of resources at undergraduate level could at least partly be addressed through curriculum review. The Strategic Plan for Graduate Studies will need to address how workloading is balanced between graduate and undergraduate programmes.

**External Reviewers Recommendations #8:** *The primary role of the program director should be that of an ambassador for the program and the unit, within the institution and externally. The director will work closely with central units on student recruitment and proactively seek cooperation on particular components of program development and support that fall into the greater realm of the mathematical sciences.*

**Unit's Response:** This recommendation is appropriate in the context of a larger institution. Here at Nipissing, where even the Department Chairs do not have any administrative support, the role of the Graduate Coordinator is severely constrained. Having said that, we fully support development and implementation of an institutional structure (the one that is lacking according to the report) in which our graduate program will have a Program Director who is adequately resourced and supported to fulfill exactly the tasks prescribed in this recommendation.

**Dean's Response:** This recommendation is essential to bolstering the graduate studies programs at Nipissing. The graduate coordinators need to play a key role in promoting and coordinating the program.

**Provost's Response:** The Graduate Coordinators will be reporting directly to the Dean of Graduate Studies in order to support the creating of a deepening culture of graduate studies at NU. I very much welcome collegial interaction with other programmes.

**External Reviewers Recommendation #9:** *Immediate suspension of admissions to the current M.Sc. in Mathematics program is not recommended. With effectively no new recruitments, the suspension would be mostly artificial; more seriously, however, a suspension of the program could diminish the motivation to proceed in a timely fashion with the recommendations above.*

**Unit's Response:** The very wording of this recommendation is worrisome, since in our view nothing in the Self-Study or the supporting documents suggest suspending a program that currently has two students, and is expected to have applications in the next academic year from within our undergraduate students.

**Dean's Response:** Given the department's relentless recruitment activities, the conjecture that there will be no student enrollments in the next academic year is skewing the realities of the challenges outlined above. Based on the recent query and survey of the department's potential student intake, I note that a number of viable international students were unable to enroll in the program due to our WES requirement, which poses another barrier to international enrolments (see the attached list of potential students). Given the small number of graduate studies programs, perhaps our admission policy has to accommodate a case-by-case assessment of potential student files, which is done in collaboration with the Registrar Office, the department, and the Deans' Offices.

All in all, after reviewing the MSc Math program self-study, the reviewers' report, and the department's response to the reviewers' report, I am concerned that, until some of the barriers noted above have been addressed, any curriculum innovation and/or pathway development would be ineffective. Having said that, I see many opportunities for the program.

**Provost's Response:** To some extent the language requirement has been addressed through recent Senate decisions to bring NU requirements more in line with other universities. Suspending admissions is a perfectly reasonable tool to use in academic planning, especially if it seems that a low enrolled grad programme is jeopardizing the delivery of a high quality undergraduate programme. No such decision is being taken at this time

**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

RECOMMENDATION	RESPONSIBLE MEMBER/UNIT	PROJECTED COMPLETION
#1, 5, 7 - Development of the Strategic Plan for Graduate Studies	Dean of Research and Graduate Studies with Department and Faculty	May 2020
#2, 4 - Contribute the development of the institutional SEM planning with an articulation of a recruitment strategy	Registrar with Department	May 2020
#6 - Prepare a report on possible collaborations with other Northern Universities	Department to submit to Dean	January 2020
#8 - Develop a plan for communicating with other graduate programmes	Department	November 2019