DATE: February 14, 2023

TO: Senate

FROM: Dr. Dwight Deugo, Vice-Provost and Associate Vice-President (Academic), and Chair,
             Senate Quality Assurance and Planning Committee

RE: Final Assessment Report and Executive Summary: Undergraduate and Graduate Programs
             in Architecture

The purpose of this memorandum is to request that Senate approve the Final Assessment Report and Executive Summary arising from cyclical program review of the undergraduate and graduate programs in Architecture.

The request to Senate is based on a recommendation from the Senate Quality Assurance and Planning Committee (SQAPC), which passed the following motion at its meeting of February 9, 2023:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the undergraduate and graduate program in Architecture.

The Final Assessment Report and Executive Summary is provided pursuant to article 5.4.1. of the provincial Quality Assurance Framework and article 7.2.24 of Carleton's Institutional Quality Assurance Process (IQAP). Article 7.2.24.3 of Carleton's IQAP (passed by Senate in November 2021 and ratified by the Ontario Universities Council on Quality Assurance in April 2022) stipulates that, in approving the Final Assessment Report and Executive Summary 'the role of SQAPC and Senate is to ensure that due process has been followed and that the conclusions and recommendations contained in the Final Assessment Report and Executive Summary are reasonable in terms of the documentation on which they are based.'

In making their recommendations to Senate and fulfilling their responsibilities under the IQAP, members of SQAPC were provided with all the appendices listed on page 2 of the Final Assessment Report and Executive Summary. These appendices constitute the basis for reviewing the process that was followed and assessing the appropriateness of the outcomes.

These appendices are therefore not included with the documentation for Senate. They can, however, be made available to Senators should they so wish.

Any major modifications described in the Implementation Plan, contained within the Final Assessment Report, are subject to approval by the Senate Committee on Curriculum, Admission, and Studies Policy, the Senate Quality Assurance and Planning Committee (SQAPC) and Senate as outlined in articles 7.4.1 and 5.1 of Carleton's IQAP.

Once approved by Senate, the Final Assessment Report, Executive Summary and Implementation Plan will be forwarded to the Ontario Universities' Council on Quality Assurance and reported to Carleton's Board of Governors for information. The Executive Summary and Implementation Plan will be posted

on the website of Carleton University's Office of the Vice-Provost and Associate Vice-President (Academic), as required by the provincial Quality Assurance Framework and Carleton's IQAP.

Senate Motion February 24, 2023:

> **THAT** Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the Undergraduate and Graduate programs in Architecture.

CARLETON UNIVERSITY COMMITTEE ON
QUALITY ASSURANCE
Cyclical Review of the undergraduate and graduate programs
in Architecture
Executive Summary and Final Assessment Report

This Executive Summary and Final Assessment Report of the cyclical review of Carleton's undergraduate and graduate programs in Architecture are provided pursuant to the provincial Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP).

EXECUTIVE SUMMARY

The undergraduate and graduate programs in Architecture reside in the Azrieli School of Architecture and Urbanism, a unit administered by the Faculty of Engineering and Design.

As a consequence of the review, the programs were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of good quality. (Carleton's IQAP 7.2.13-7.2.14).

The External Reviewers' report offered a very positive assessment of the programs. Within the context of this positive assessment, the report nonetheless made a number of recommendations for the continuing enhancement of the programs. These recommendations were productively addressed by the Director of the School of Architecture and Urbanism and the Dean of the Faculty of Engineering in responses to the External Reviewers' report and Implementation Plan that was submitted to SQAPC on February 9, 2023.

FINAL ASSESSMENT REPORT

Introduction

The undergraduate and graduate programs in Architecture reside in the Azrieli School of Architecture and Urbanism, a unit administered by the Faculty of Engineering and Design.   This review was conducted pursuant to the Quality Assurance Framework and Carleton's Institutional Quality Assurance Process (IQAP). As a consequence of the review, the programs were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of good quality. (Carleton's IQAP 7.2.13-14).

The site visit, which took place on November 29-December 1, 2021, was conducted by Dr. Sarah Bonnemaison from Dalhousie University, Dr. Izabel Amaral from the University of Montreal and Mr. Diarmuid Nash from Moriyama and Teshima Architects. The site visit involved formal meetings with the Provost, the Vice-Provost and Associate Vice-President (Academic), the Dean of the Faculty of Engineering and Design, the Dean of the Faculty of Graduate and Postdoctoral Affairs, and the Director of the Azrieli School of Architecture and Urbanism. The review committee also met with faculty members, staff, and undergraduate and graduate students.

The External Reviewers' report, submitted on February 22, 2022 offered a very positive assessment of the program.

This Final Assessment Report provides a summary of:

- Strengths of the programs
- Challenges faced by the programs
- Opportunities for program improvement and enhancement
- The Outcome of the Review
- The Implementation Plan

This report draws on five documents:

- The Self-study developed by members of the Azrieli School of Architecture and Urbanism (Appendix A)
- The Report of the External Review Committee (Appendix B).
- The response and implementation plan from the Director of the Azrieli School of Architecture and Urbanism (Appendix C)
- The response from the Dean of the Faculty of Engineering and Design (Appendix D).
- The internal discussant's recommendation report (Appendix E).

Appendix F contains brief biographies of the members of the External Review Committee.

This Final Assessment Report contains the Implementation Plan (Appendix C) developed by the Director of the Azrieli School of Architecture and Urbanism and agreed to by the Dean of the Faculty of Engineering and Design for the implementation of recommendations for program enhancement identified as part of the cyclical program review process.

The Implementation Plan identifies who is responsible for implementing the agreed-upon recommendations, as well as the timelines for implementation and reporting.

Strengths of the programs

General

The External Reviewers' Report states that "[e]veryone we met with were caring, stressed, concerned and seemingly exhausted after almost two years in the pandemic. ASAU Staff teach, mentor, research, administer and inspire with a passion and dedication that was very evident in our exchanges. ASAU Students were so impressive in their eloquence and positivity as they described their isolated educational journey while yearning for a pre-pandemic school of collaborative studios, packed libraries, busy workshops and full classrooms."

Faculty

Speaking with regard to faculty, the external reviewers' stated: "[b]ased on the impressive CVs and our discussions with the faculty, the current faculty members at ASAU are a real strength of the school."

Curriculum

The external reviewers noted that "[t]he Azrieli School of Architecture and Urbanism offers a unique range of programs, both the professional Canadian Architectural Certification Board (CACB) accredited program of architecture and non-accredited programs. The reviewers were asked to evaluate the programs per ASAU's overall strategy, which we understand to be part of the School's five year "Vision Statement & Strategic Action Plan" undertaken in 2016."

Opportunities for program improvement and enhancement

The External Reviewers' Report made 9 recommendations for improvement:

1. Find ways to mitigate the impact of Covid-19 on research, especially for pre-tenured faculty. The extra time given for tenure should equal the time faculty members were impacted by the pandemic. (Weakness)

2. There is an urgent need to update an iconic and beloved architecture building. (Weakness)

3. The library budget is too small. Financially support alliances with extensive digital archives of architectural images such as Sahara's Society of Architectural Historians. Increase the acquisition budget to fill the ongoing gap in architecture books authored by women and about women designers. (Weakness)

4. Support a faculty hiring plan that responds to finishing term appointments, upcoming retirements, and the size of programs. Open part-time teaching positions. Analyze how administrative tasks are performed and make necessary changes to become more efficient. (Concern)

5. It would be normal for a school of this size to have a communication officer and/or a community outreach position. The reviewers recommend that more support staff be added to the school. (Concern)

6. Need for studio teaching and architectural history courses to include a larger number of case studies where the lead designed was a woman and increase global references. (Concern)

7. The building is a valuable teaching tool in the study of mid-modern conservation. Take heritage qualities of the building seriously. Draw on local organizations such as the National Capital Commission and create a public venue visible from the street where architectural models of proposed projects for Ottawa could be exhibited and discussion to occur. This could be integrated into Urban Design and Conservation programs. (Opportunity)

8. For the school to be its own faculty, independent from the Faculty of Engineering. Grow relationships with industrial design through joint studios and research opportunities with create non-accredited programs (landscape, interior design). Create relationships with art history, museology. (Opportunity)

9. Consider entrepreneurial initiatives as a form of curricular and professional enrichment. (Opportunity)

Program Considerations

The following are additional suggestions presented by the external reviewers which they did not classify as mandatory program recommendations:

"Carleton University advances a culture of continuous improvement through the Office of Quality Initiatives OGI. The Office of Quality Initiatives is available to all administrative and academic departments at Carleton University to assist with the analysis and redesign of existing core administrative processes to achieve effectiveness and efficiency in day-to-day operations."[1]

"Three core administrative processes that may benefit from an OQI Process Review are: Undergraduate and Graduate Administrators Workload, Faculty Members Committee Workload and Managing ASAU Communication"

• "Undergraduate and Graduate Administrators Workload"

"Undergraduate and graduate administrators must deal with a complex and heavy workload since the programs correspond to various policies and curricular requirements. Compared to other schools, the External Review Team observed that their workload seems heavier and significantly more complex. Therefore, this administrative area will benefit from an OQI Process Review"

---

[1] Process Reviews – this approach to process improvement engages stakeholders in an analysis of the current state of operations, identifying problems, envisioning an improved future state, and documenting steps to achieve that future vision.

• "Faculty Members' Committee Workload"

The presence of multiple faculty members on every committee is not sustainable, therefore tasks need to be split and delegated for the school to function more efficiently and allow faculty members to invest more time in research. The External Review Team's observation is that the faculty's administrative workload should be reviewed to allow more time for faculty to do their job well. This administrative area will benefit from an OQI Process Review.

• "Managing ASAU Communication"

"How ASAU should best manage and coordinate the information it disseminates across the range of communication channels?"

"The External Review Team's observation is that a dedicated communication officer or staff member would allow for effective and coordinated internal communication between the school and students, provide more public and professional visibility, and increase the school's social impact. This administrative area will benefit from an OQI Process Review."

The Outcome of the Review

As a consequence of the review, the undergraduate and graduate programs in Architecture were categorized by Carleton University's Senate Quality Assurance and Planning Committee (SQAPC) as being of **GOOD QUALITY** (Carleton's IQAP 7.2.13-14).

The Implementation Plan

The recommendations that were put forward as a result of the review process were productively addressed by the Director of the Azrieli School of Architecture and Urbanism and the Dean of the Faculty of Engineering and Design, in responses to the External Reviewers' report and Implementation Plan that was considered by SQAPC on February 9, 2023. The School agreed unconditionally to recommendations #1, 2, agreed to recommendations #3, 4 and 5 if resources permit and agreed to recommendations #6, 7, 8 and 9 in principle.

It is to be noted that Carleton's IQAP provides for the monitoring of implementation plans. A monitoring report is to be submitted by the academic unit and Faculty Dean, and forwarded to SQAPC for its review by September 1, 2023.

The Next Cyclical Review

The next cyclical review of the undergraduate and graduate programs in Architecture will be conducted during the 2024-25 academic year.

<div align="center">

Architectural Studies
Unit Response to External Reviewers' Report & Implementation Plan
Programs Being Reviewed: Undergraduate and Graduate Programs

</div>

Note: This document is forwarded to Senate, the Quality Council and posted on the Vice-Provost's external website.

Introduction & General Comments

The Department/School/Institute was pleased to receive the Reviewers' very positive External Reviewers' Report on March 7, 2022. This Report was shared with our faculty and staff, and we are committed to the continual improvement of our programs to enhance the student, staff, and faculty experience. This document contains a response to the External Reviewers' Report and an Implementation Plan (Section B), created in consultation with Dean Larry Kostiuk, Faculty of Engineering & Design.

For each recommendation, ***one*** of the following responses was selected:

Agreed to unconditionally: used when the unit agrees to and is able to take action on the recommendation without further consultation with any other parties internal or external to the unit.

Agreed to **if additional resources permit:** used when the unit agrees with the recommendation, however, action can only be taken if additional resources are made available. Units must describe the resources needed to implement the recommendation and provide an explanation demonstrating how they plan to obtain those resources. In these cases, discussions with the Deans will normally be required and therefore identified as an action item.

Agreed to in principle: used when the unit agrees with the recommendation, however action is dependent on something other than resources. Units must describe these dependencies and determine what actions, if any, will be taken.

Not agreed to: used when the unit does not agree with the recommendation and therefore will not be taking further action. A rationale must be provided to indicate why the unit does not agree (no action should be associated with this response).

Calendar Changes
None of the action items we intend to implement will result in calendar changes.

Hiring
Where an action item requires additional hiring (faculty or staff), the Dean of the faculty and members of the unit will be made aware.

UNIT RESPONSE AND IMPLEMENTATION PLAN

Programs Being Reviewed: Undergraduate and Graduate Programs in Architecture

Prepared by (Federica Goffi/Interim Director, ASAU, FED, CU; Ben Gianni, Associate Professor, ASAU, FED, CU):

External Reviewer Recommendation & Categorization	Unit Response (choose only one for each recommendation): 1- Agreed to unconditionally 2- Agreed to if additional resources permit (describe resources) 3- Agreed to in principle 4- Not agreed to Rationales are required for categories 2, 3 & 4	Action Item	Owner	Timeline	Will the action described requiring calendar changes? (Y or N)
1. *Find ways to mitigate the impact of Covid-19 on research, especially for pre-tenured faculty. The extra time given for tenure should equal the time faculty members were impacted by the pandemic. (Weakness)*	**Agreed to unconditionally**	The effects of the pandemic were such that there were limited opportunities for travel, and research support was hindered. Many archives and laboratories were operating in a limited way or were entirely closed. Such research limitations should be considered. Tenure track faculty and faculty applying for promotion had the chance to request a delay to apply for tenure/promotion due to the impact of the COVID19 pandemic during this academic year (2021-2022). The Interim Director already inquired on whether the tenure/promotion process may be extended by one or two years for faculty going up for tenure in future years if they were in the tenure process during the pandemic. This is because faculty worked online for about that time, and research opportunities were limited. However, such a decision would need to be taken at the University level and in consultation with CUASA.	*Interim Director Federica Goffi* *Interim Director* *Dean FED Larry Kostiuk*	*2021-2022* *June 2022-onwards*	*N*

2. There is an urgent need to update an iconic and beloved architecture building. (Weakness)	**Agreed to unconditionally**	The concern for the need to update the Architecture Building is shared by the ASAU Faculty Board and enjoys broad support among Architecture alumni. In addition, the state of the Architecture Building was also raised as a critical concern by the Canadian Architectural Certification Board (CACB) in the Visiting Team Report of 2017 (non-met Condition 7: Physical Space). In June 2021, former Director Jill Stoner provided the CACB with a document prepared by the Toronto firm LGA outlining various approaches to the renewal of the Architecture Building. These included life-cycle and energy performance upgrades and multiple scales of alterations to address deficiencies in teaching, workshop, labs, and research spaces. The CACB responded with a request for additional information. In September 2021, an addendum was submitted by the Interim Director, Federica Goffi, outlining how the ASAU has been addressing maintenance while developing a feasibility study that addresses the issue holistically. The Report included a list of work completed by Facilities Management and Planning (FMP) over the last six years, for which expenditures totaled $2,845,500. On July 1, 2021, the ASAU Interim Director began discussions with the Advancement Office, FMP, and FED Dean Larry Kostiuk on fundraising for the building. The ASAU will need the approval and support from the Board of Governors of Carleton University to undertake what is expected to be a multi-million-dollar capital campaign. The School is in the early stages of planning for a meeting with the President and Provost. Pending	*Interim Director & Members of the Building Renewal Committee*	*Ongoing:* *June 2021* *September 2021*	*N*

		their approval of the initiative, a presentation will be made to the Board of Governors. These meetings, which are expected to take place during the Summer or Fall of 2022, are essential in deciding the scale of the renewal project and the fundraising campaign. The School hopes to move forward with a proposal that accommodates growth over the next ten years. A modest expansion would enable us to welcome additional students in new and existing programs, notably a new Master of Architecture and Urban Design (MAUD) program and a new Master of Adaptive Architecture (M+AA). Other opportunities for expansion and growth are also under discussion. We also envision an innovative approach to energy retrofits that would respect the heritage value of the building and put us at the forefront of sustainable building practices in Canada. We envision the renovation of the building to be a case study for other architecturally significant, mid-century buildings around the world, many of which require life-cycle reinvestment. It is anticipated that the renovation and possible expansion of the building would be funded through support from the donor(s), the Faculty of Engineering and Design, and Carleton University. We hope to identify the best path forward and secure funding before the next CACB accreditation visit, scheduled for Fall 2024.		*July 2021-ongoing* *Summer/Fall 2022* *Fall 2024*	

| 3. The library budget is too small. Financially support alliances with extensive digital archives of architectural images such as Sahara's Society of Architectural Historians. Increase the acquisition budget to fill the ongoing gap in architecture books authored by women and about women designers. (Weakness) | **Agreed to if additional resources permit (describe resources)** | MacOdrum Library's collection includes a significant number of books on architecture (third floor), urbanism and cities (fourth floor), and periodicals (basement). With the pivot to online resources (e.g., the Haiti Trust), students and faculty now access even more resources, including digital subscriptions. The interlibrary loan system is excellent for ordering books or requesting digital scans. Members of the Carleton community may also borrow books from the University of Ottawa.

The library has been very responsive to our requests for acquiring resources, helping students and faculty access them, and preparing courses (e.g., assessing copyright limits, putting resources on reserve, etc.). In addition, the Library Reserves staff scans course readings and uploads materials to ARES in Brightspace. The latter is especially helpful as it allows access to readings from off-campus.

The Carleton University Librarian for Architecture, Kristof Avramson, and Dr. Inderbir Riar, who serves as the faculty liaison with the MacOdrum library, have been made aware of this concern. However, as we believe this concern may result from a misunderstanding, we've asked Mr. Avramson to communicate with faculty and students to make them aware of what resources are available and how to make requests to supplement the collection.

It is worth noting that Mr. Avramson leads a research methods workshop in ARCH 2300/5010, which means that all BAS and M.Arch students acquire knowledge of how to tackle university-level library research. | *Interim Director*

Library Faculty Liaison Inderbir Riar

Carleton University Librarian Kristof Avramson | *2022-2023* | *N* |

4.	Support a faculty hiring plan that responds to finishing term appointments, upcoming retirements, and the size of programs. Open part-time teaching positions. Analyze how administrative tasks are performed and make necessary changes to become more efficient. (Concern)	**Agreed to if additional resources permit (describe resources)**	Term appointees, which are generally only available to fill open positions temporarily, offer the School the opportunity to introduce new perspectives. Term appointees are encouraged to apply for full-time jobs. The possibility of establishing part-time "professor of practice" positions has been raised and could be considered in future tenure-track searches. Indeed both Professors Lucie Fontein and Paul Kariouk, both regular faculty appointees, have occupied such positions recently. However, the School would have to assess the cost of such appointments compared to our current practice of acquiring such expertise by hiring practicing professionals as Contract Instructors.	*ASAU Interim Director* *Dean, FED* *& ASAU Faculty Board*	*TBD*	*N*
5.	It would be normal for a school of this size to have a communication officer and/or a community outreach position. The reviewers recommend that more support staff be added to the school. (Concern)	**Agreed to if additional resources permit (describe resources)**	The School currently has such a position (Special Programs and Communications Officer, Maria Cook), funded through revenues from its non-degree, professional development, and summer programs. As the duties of this position include administrative support of these programs, however, her focus is divided. If the School requests a regular staff position dedicated to communications, i.e., one funded through its base budget rather than through revenues, it would likely be asked to reallocate existing staff resources. While highly desirable, it seems unlikely that the Dean would approve additional staff support, especially given the recent addition of the Building Curator position in 2021/22, which is being funded on a year-to-year basis. Much of the workload of the Undergraduate Administrator is the result of regular program (Calendar) changes. As a result, much of her time is spent dealing with exceptions and keeping track of student requirements in different program years and those who are "out of sequence." While the	*ASAU Director*	*2022-2023* *2023-2024*	*N*

		Curriculum Committee has been attempting to address this, changes cause even more complications in the short term. Scheduling is also complex, especially on the undergraduate level, where so many courses are required and must be taken in a specified sequence, and accommodations must be made for students (i.e., those on co-op) who are out of sequence. As it is gearing up to add two new graduate programs (MAUD, M+AA), the School must be mindful of the additional burden on the regular admin staff. As envisioned, however, the faculty and administrative resources required to support the MAUD program would be covered by its revenues. It may even become possible to reallocate administrative duties relating to other special programs to the individual(s) hired to administer the MAUD program, i.e., consolidate administrative responsibilities for all special (revenue-generating) programs to enable the Communications Officer to focus exclusively on communications, and community outreach.		*MAUD* *M+AA launch: Fall 2024 / Fall 2025*	
6. Need for studio teaching and architectural history courses to include a larger number of case studies where the lead designed was a woman and increase global references. (Concern)	**Agreed to in principle**	We agree with this recommendation in principle, and intend to make appropriate changes, pending discussion with the appropriate individuals and further clarification. As we are preparing for the upcoming CACB accreditation (Fall 2024), we will plan to thoroughly review our syllabi and advise faculty and instructors to ensure that the scholarship of women in architecture and other fields is not overlooked. Our preparations will begin this summer, and the advice will be sent out to faculty and CI to prepare the writing and updating of syllabi for the next academic year (2022-2023).	*Director* *+* *Accreditation Committee* *+ Graduate and Undergraduate Curriculum Committees*	*Summer 2022*	*N*

| 7. The building is a valuable teaching tool in the study of mid-modern conservation. Take heritage qualities of the building seriously. Draw on local organizations such as the National Capital Commission and create a public venue visible from the street where architectural models of proposed projects for Ottawa could be exhibited and discussion to occur. This could be integrated into Urban Design and Conservation programs. (Opportunity) | **Agreed to in principle** | The Architecture Building is indeed a teaching tool integrated into the pedagogy of the school, starting from the first year of the Bachelor of Architecture Studies (BAS) into graduate programs. First-year students survey and document the building using analog methods (i.e., drawing and drafting by hand). Structures and building technology courses regularly reference the building, leveraging the fact that structural elements, plumbing, electrical, and mechanical systems are exposed. Finally, students in upper-level conservation courses, including the Graduate Diploma in Architectural Conservation, undertake regular heritage and conservation assessments of the building.

The School envisions the renovation of the Architecture Building as an opportunity to showcase innovative approaches to the conservation of mid-century modernist and brutalist buildings in Canada while adapting them to changing uses and needs and improving their energy performance. | *Director*

+

Associate Directors & Coordinator of the Architectural Conservation program | *Ongoing* | *N* |
| 8. For the school to be its own faculty, independent from the Faculty of Engineering. Grow relationships with industrial design through joint studios and research opportunities with create non-accredited programs (landscape, interior design). Create relationships with art history, museology. (Opportunity) | **Agreed to in principle** | This recommendation might reflect a preference on the part of the external reviewers since the architecture programs at both Dalhousie and the Université de Montréal are within stand-alone faculties of Architecture and Planning.

The Azrieli School of Architecture and Urbanism would need a significantly larger endowment and considerably more students (programs, degrees, etc.) to make a case for being a stand-alone faculty. Even with plans both to grow existing programs and introduce new ones (e.g., the Master of Architecture and Urban Design, the Master of Adaptive Architecture (M+AA), and, potentially, a Master of Landscape Architecture and a | *Director / Dean* | *Ongoing* | *N* |

		Master of Planning), further study is required to determine whether this is desirable or feasible.			
9. Consider entrepreneurial initiatives as a form of curricular and professional enrichment. (Opportunity)	**Agreed to in principle**	This could be a significant area of expansion and growth for the school. We are a professional school, and part of the education is for students to learn about the business aspect of the profession. We are already collaborating with the Business School, and open to future collaborations with them. We continue to be interested in how entrepreneurial activities take form in architecture and have impact beyond academia, and defining further the type of profit and social capital it can build. Much of this is already happening through the school's research labs, most particularly through Carleton Immersive Media Studio CIMS Carleton Sensory Architecture and Liminal Technology Laboratory CSALT, as well as through the Action Lab. Participation of our MArch and Ph.D. students in the research labs often lead to new projects, such as partnership in robotic design for manufacturing (currently funded by MITACS and supported by industry partners), or work on the development of digital twins for cities in Canada. In addition, the labs connect with various institutions nationally and internationally, with industry partners, local communities and municipalities, government organizations, etc. We could envision these opportunities being integrated more intentionally in the curriculum, whether as elective courses or through funded directed research opportunities at the graduate level. The future expansion of such collaborations could entail reinvigorating the connection with architecture firms in Canada and abroad through different types of partnerships and sponsorships, such as those funded by	*Director* *Faculty Board*	*Ongoing*	*N*

		MITACS, or exploring the possibility of interdisciplinary ventures that could be connected to CU@Kanata, as we have already worked with researchers at Hub 350. Ultimately, we are open to initiatives and resources that could support us in this area, particularly as entrepreneurship is one of the University's priorities. .			

DATE: February 14, 2023

TO: Senate

FROM: Dr. Dwight Deugo, Vice-Provost and Associate Vice-President (Academic), and Chair, Senate Quality Assurance and Planning Committee

RE: Final Assessment Report and Executive Summary: Joint Graduate Programs in Mathematics and Statistics

The purpose of this memorandum is to request that Senate approve the Final Assessment Report and Executive Summary arising from the University of Ottawa led cyclical program review of the joint graduate programs in Mathematics and Statistics.

The request to Senate is based on a recommendation from the Senate Quality Assurance and Planning Committee (SQAPC), which passed the following motion at its meeting of January 26, 2023:

THAT SQAPC recommends to SENATE the approval of the Final Assessment Report and Executive Summary arising from the cyclical program review of the joint graduate programs in Mathematics and Statistics.

The Final Assessment Report and Executive Summary is provided pursuant to the Carleton University and University of Ottawa Joint Process Document for Joint Graduate Programs (November 20, 2020) section 5.0, which stipulates that "the Final Assessment Report receives the required approval(s) from each institution".

Once approved by Senate, the Final Assessment Report, Executive Summary and Implementation Plan will be forwarded to the Ontario Universities' Council on Quality Assurance and reported to Carleton's Board of Governors for information. The Executive Summary and Implementation Plan will be posted on both institution's websites as required by the provincial Quality Assurance Framework.

Senate Motion February 24, 2023:

> **THAT** Senate approve the Final Assessment Report and Executive Summary arising from the Cyclical Review of the joint Graduate programs in Mathematics and Statistics.

FINAL ASSESSMENT REPORT
Evaluation of Graduate Programs
Department of Mathematics and Statistics   School of Mathematics and Statistics
Faculty of Science   Faculty of Science
University of Ottawa   Carleton University
Cycle: 2016–2017
Date: 2021-12-08

I.   Programs

- Master of Science Mathematics and Statistics Concentration in Mathematics
- Master of Science Mathematics and Statistics Concentration in Statistics
- Doctorate in Philosophy Mathematics and Statistics

II.   Evaluation Process (Outline of the visit)

- The Final Assessment Report for the evaluation of the aforementioned programs was based on the following documents: (a) the self-study brief produced by the academic unit, (b) the report produced by the external evaluators following their site visit, and (c) the comments from the leadership of the programs on the aforementioned documents—at the University of Ottawa: Dean of the Faculty of Science, Louis Barriault, Department Chair, Paul-Eugène Parent, Director of the program, Gilles Lamothe, and Former Director of the program, Benoit Dionne; at Carleton University: Interim Dean of the Faculty of Science, Maria DeRosa, School Director, Paul Mezo, and Director of the program, Colin Ingalls.
- The visit was conducted virtually due to the SARS-CoV-2 pandemic. The reviewers were provided a comprehensive self-study brief that had been previously presented and discussed by the Ottawa-Carleton Institute in Mathematics and Statistics on December 16, 2019. The virtual visit included Claude Laguë from the Faculty of Engineering, University of Ottawa, and Michael Hilderbrand from the Faculty of Health Sciences, Carleton University, as internal delegates.
- The site visit, which took place on February 16–17, 2021, was conducted by Xikui Wang from the University of Manitoba and Dmitry Pelinovsky from McMaster University.
- During the site visit, the external evaluators met with the Vice-Provost, Graduate and Postdoctoral Studies, uOttawa, Claire Turenne-Sjolander, the Dean, Faculty of Graduate and Postdoctoral Affairs, Carleton, Patrice Smith, the Dean of the Faculty of Science, uOttawa, Louis Barriault, the Dean of the Faculty of Science, Carleton, Chuck MacDonald, the Vice-Dean of Graduate Studies, uOttawa, André Beauchemin, the Vice-Dean of Research and Infrastructure, uOttawa, Marc Ekker, the Department Chair, uOttawa, Paul-Eugène Parent, the Director of the Program, Gilles Lamothe, uOttawa, Former Director of the program, uOttawa, Benoit Dionne, School Director, Carleton, Paul Mezo, the Director of the program, Carleton, Colin Ingalls, the library representative, uOttawa, from both institutions: members of the support staff, regular professors and graduate students.

III.   Summary of Reports on the Quality of Programs[1]

This section aims to inform the unit on the strengths and weaknesses observed during the evaluation process in order to improve its programs.

1.   EMPHASIZING THE STRENGTHS AND IDENTIFYING CHALLENGES

Strengths

- Joint Institute between the two universities gives students access to a wide array of courses and expertise.
- Well-established departments of international renown in several fields of mathematics and statistics; especially in algebra and analysis.
- The recent changes for the funding of graduate students at the University of Ottawa are seen as very positive and can have a positive impact on recruiting and retaining international students.
- Challenging and rewarding experiences for graduate students.

Challenges

- There is a need to better inform students about potential careers and develop professional skills.
- Lack of communal space at uOttawa (e.g. lunch area for graduate students and professors).
- Although the collaboration between the two universities has been largely collegial and positive, increased collaboration should be sought.

Sections 2–6 provide the context and rationale for the subsequent recommendations

2.   PROGRAM OBJECTIVES

- The program requirements and the associated learning outcomes are clearly described in the self-study report and aligned with each university's statement of degree-level expectations.
- The joint program's mission and identity are clearly stated and resonate well with the strategic plans of the University of Ottawa and Carleton University.
- There is a need to review the program objectives for the project-based master's degree, which is currently seen as having a dual role. On the one hand, for the better-achieving students in the course-based option, this is a possibly to further enhance their student experience. Whereas, for students with difficulties in the thesis-based option, this is seen as an "exit" solution.

3.   CURRICULUM AND STRUCTURE

- Overall, the admission requirements are consistent with the learning outcomes of the MSc and PhD programs offered by the graduate programs.
- The external evaluation report argues that the number of required courses at the PhD level is high, with 6 × 3 credits. Compared to other programs in the Faculty of Science at both institutions, Carleton and uOttawa, 6 courses is an upper limit. In its response, the academic unit indicates that compared to other institutions in Ontario, including Toronto, Queens and

---

[1] Based on every document prepared during the assessment process, sometimes the information is extracted verbatim.

Waterloo, the number of courses appears to be average. More importantly, the institute strives to provide a broad knowledge of mathematics and statistics.

4. TEACHING, LEARNING AND EVALUATION METHODS

- The modes of delivery and evaluation appear to be "traditional". However, these are deemed appropriate and effective to meet the graduate program's learning objectives.
- The external reviewers have expressed concerns with the comprehensive examination. Namely, variations have been observed between evaluations, which could give the impression that the process is unfair.
- It was suggested to create at least one course that would be attended by PhD students only.
- Finally, some students have expressed the need for additional training in professional skills and career guidance.

5. STUDENT EXPERIENCE

- Interviews with the master students in the coop stream indicates a high level of satisfaction with the placement and employment opportunities after graduation.
- The number of students withdrawing from the program is low. When students do withdraw from the program, it is usually for personal reasons.
- There are concerns with the visibility of the program on the Web. Namely, to inform the students about the current research and the career opportunities.
- At uOttawa, the students interviewed would welcome the opportunity to take courses in the spring term.
- Greater variations in the funding of graduate students have been observed at Carleton.

6. PHYSICAL SPACES AND RESOURCES

- External reviewers recognize that both institutions have made significant efforts since the last cyclical review to enhance the physical and human resources.
- The external evaluation gives the impression that the workload of the administrative personnel at the University of Ottawa is high. Further assessment will be needed. Depending on the outcome, corrective measures should be in place before the student experience is negatively impacted.
- It was suggested that both institutions should find ways to increase the funding for international students to attract the best students.
- "The disciplines of mathematics and statistics normally do not require specific laboratory facilities and equipment, except for computing equipment and library resources, which seem adequate."
- Finally, the external evaluation highlights the lack of common spaces for graduate students at the University of Ottawa.

IV. Program Improvement[2]

<div style="border:1px solid">

The programs under evaluation are in conformity with the standards of the discipline. The following recommendations aim at maintaining or increasing the level of quality already achieved by the programs.

</div>

1. Program Objectives, Learning Outcomes, Mandate and University Plan

Recommendation 1.1: Increase the level of collaboration between the two departments in the joint Ottawa-Carleton Institute of Mathematics and Statistics.

2. Curriculum and Structure

Recommendation 2.1: Reform the basic comprehensive examination so that it is more consistent.

Recommendation 2.2: Standardize some graduate courses so that students' background is relatively consistent

3. Teaching, Learning and Evaluation Methods

4. Student Experience and Governance

Recommendation 4.1: Improve the communal space for both faculty and students to enhance the sense of belonging and encourage collaboration.

Recommendation 4.2: Further enhance student experience by organizing professional development workshops, research and grant writing workshops, and improving the visibility of graduate programs.

5. Physical Spaces and Resources

Recommendation 5.1: Discuss the departmental plan on new faculty hiring.

Recommendation 5.1: Review the administrative support offered to the Department of Mathematics and Statistics at the University of Ottawa.

V. List of courses not offered for more than three years and the reasons

The following courses have not been offered in recent years, and should be removed from the catalogue.

- MAT 5106 Combinatorial Optimization;
- MAT 5506 Optimisation combinatoire;
- MAT 5121 Introduction to Hilbert Space;
- MAT 5521 Introduction aux espaces hilbertiens;
- MAT 5127 Complex Analysis;
- MAT 5527 Analyse complexe;
- MAT 5146 Rings and Modules;
- MAT 5546 Anneaux et modules
- MAT 5147 Homological Algebra and Category Theory;
- MAT 5547 Algèbre homologique et théorie des categories;
- MAT 5148 Groups Representations and Applications;
- MAT 5548 Représentation de groupes et applications;

---

[2] Based on the External Evaluators Report.

- MAT 5150 Topics in Geometry;
- MAT 5155 Differentiable Manifolds;
- MAT 5555 Variétés différentielles
- MAT 5162 Mathematical Foundations of Computer Science;
- MAT 5167 Formal Language and Syntax Analysis;
- MAT 5567 Langages formels et analyse syntactique;
- MAT 5168 Homology Theory;
- MAT 5568 Homologie;
- MAT 5169 Foundations of Geometry;
- MAT 5173 Stochastic Analysis;
- MAT 5175 Robust Statistical Inference;
- MAT 5176 Advanced Statistical Inference;
- MAT 5576 Inférence statistique;
- MAT 5177 Multivariate Normal Theory;
- MAT 5577 Analyse multivariée normale;
- MAT 5197 Stochastic Optimization;
- MAT 5597 Optimisation stochastique;
- MAT 5304 Nonlinear Optimization;
- MAT 5309 Harmonic Analysis on Groups;
- MAT 5709 Analyse harmonique sur les groupes;
- MAT 5315 Advanced Design of Surveys;
- MAT 5715 Planification des sondages;
- MAT 5990S M.Sc. Séminaire / Seminar M.A.;
- MAT 5990T Séminaire / Seminar.

The following courses are topics courses that have not been offered in recent years. However, they should remain in the catalogue to allow a course to be offered in that topic in the future.

- MAT 5172 Topics in Stochastic Processes;
- MAT 5572 Processus stochastique : Chapitres choisis
- MAT 5308 Topics in Algorithm Design;
- MAT 5312 Topics in Topology;
- MAT 5712 Topologie : Chapitres choisis;
- MAT 5325 Topics in Information and Systems Science;
- MAT 5329 Topics in Analysis;
- MAT 5728 Analyse : Chapitres choisis;
- MAT 5328 Topics in Analysis;
- MAT 5729 Analyse : Chapitres choisis;
- MAT 5361 Topics in Mathematical Logic;
- MAT 5761 Logique mathématique : Chapitres choisis.

VI. **Conclusion**

The Ottawa-Carleton Institute of Mathematics and Statistics (OCIMS) offers high quality graduate training in a variety of fields. The two constituting departments have a well-established international reputation in fundamental fields of mathematics and statistics, with renowned researchers in several areas of mathematics and statistics; especially in algebra and analysis. The

program objectives and learning outcomes are well articulated and meet the degree-level expectations set by the Ontario Universities Council on Quality Assurance (OUCQA). "OCIMS is overall strong, vibrant and collegiate." "The OCIMS is a unique model in the Canadian mathematical and statistical communities." The joint institute gives students access to a large array of courses "and graduate students likely have the best chance of learning from the best experts from the two universities". Suggestions for improvement are largely constructive in nature that is the comments focused on improving an already successful program, rather than indicating that fundamental changes are required.

Considering this positive assessment, the committee members would like to thank all participants for the evaluation of the programs. They congratulate the unit on the rigour of the work accomplished and on the quality of the self-study report, as well as that of the report produced by the external reviewers.

Schedule and Timelines

A meeting will be organized with the program chairs, the Faculty Dean and Vice-Dean following the reception of the Final Assessment Report so that a plan of action can be put in place along with deadlines particular to each recommendation. A progress report that outlines the completed actions and subsequent results will be submitted to the evaluation committee on a date agreed upon at the time of the meeting regarding the action plan.

The next cyclical review will take place in no more than eight years, in 2024–2025. The self-study brief must be submitted no later than June 2024.