



Office of the Vice-Provost and Dean
Yeates School of Graduate Studies

Final Assessment Report and Implementation Plan

Periodic Program Review (PPR)

Building Science (MAsc, MBSc)

Last Updated: April 5, 2018

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FINAL ASSESSMENT REPORT

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

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

Executive Summary

Building science bridges the gap between architecture and engineering. It seeks to apply the scientific fundamentals of building physics to the interaction between the components of a building, its users, and the environment. The Building Science Graduate Program at Ryerson University is an interdisciplinary graduate program unique in Canada that bridges the gap between engineering and architecture, while overlapping with both disciplines. It provides graduates of building-related programs an opportunity to explore the building science principles necessary to deliver sustainable buildings. Through the Department of Architectural Science, the program offers a one-year (minimum) Master of Building Science (MBSc) degree and a two-year (minimum) Master of Applied Science (MAsc) degree. The program admits students from a range of backgrounds, including principally building science, engineering and architecture. However, nearly a quarter of all students come from other undergraduate degrees, not directly related to buildings. This multidisciplinary nature of the program is a particular feature but also presents challenges.

The program seeks to achieve the following, as developed by the Department of Architectural Science in conjunction with other departments in FEAS:

- The program shall be relevant to industry, bringing theory into practice.
- The program shall be forward thinking progressive, future oriented and striving to lead and serve industry in the coming decades.
- The program shall be cognizant with the Department's traditions which foster a practice oriented, holistic approach to building design.
- The program's graduates shall be educated to become leaders, strong collaborators, with the flexibility to take on many roles in the AEC industry; independent, critical thinkers with the skills needed to conduct research required in industry.
- The program will be distinctive to Ryerson University.

Over the eight years of its existence, the Building Science Graduate Program has built a reputation for the quality of education and relevance to industry and the curriculum continues to evolve and improve to meet industry needs. The program has attracted some highly qualified students who have undertaken important research work that has been widely published. Due to the mixed nature of the student body some students have struggled to complete the requirements of the program (particularly

within the 1 year for MBSc), and in particular many part time students find it difficult to manage a balance of their responsibilities between work and study.

The program has a number of strengths, including:

- High percentage of graduate employment
- Multidisciplinary background of students and faculty supports innovation
- A unique field of study with a broad range of courses
- Flexibility in ways to complete the program with numerous options for research
- Significant offerings of extracurricular/competitions and collaborative opportunities

These strengths, among others, serve to provide continued, positive growth for the program.

However, several weaknesses show there is room for improvement. These include:

- Shortage of technical staff and space to support significant growth in research and teaching laboratory activities
- Lack of a cohesive vision amongst faculty for long term research initiative(s)
- Multidisciplinary background of students, at times, limits initial rapid uptake of technical information in core courses
- The one year (three term) MBSc degree is challenging to complete in the time allotted
- The curriculum requires review to identify gaps and eliminate unnecessary content repetition

By building on current strengths and addressing current weaknesses, the program has identified significant opportunities to promote positive growth and position itself as the leading building science graduate program in Canada and North America in the future, including:

- Advertising and building 'brand recognition' among competing graduate programs in similar and related fields
- Introduction of a Ph.D. degree
- Increase collaboration with local and regional institutions
- Establish a centre of excellence, building upon state of the art laboratory and computing facilities
- Enhancing recruitment strategies to target high quality applicants

In response to the data and analysis in this periodic program review self-study report, the program has identified the following 10 key items comprising the development plan:

1. Recommending Changing from 3 to 4 term for MBSc Degree
2. Establishing Ph.D. program
3. Developing repository of course work and student work for all courses (i.e. e-course binders)
4. Creating fundamental and advanced courses in core subject areas
5. Creating on-line courses offerings
6. Defining the evolution of the MRP
7. Working on addressing the varied background of incoming students
8. Expanding collaboration with other programs
9. Enhancing facilities we provide (studio space, computers, etc.)
10. Growing and optimizing the building science lab

The program aims to address these items in the next 2 to 5 years.

Periodic Program Review and Peer Review Team

Building Science (MAsc, MBSc)

The graduate program in Building Science (MAsc, MBSc), Department of Architectural Science - Faculty of Engineering, Architecture and Science (FEAS), submitted a Self-Study Report to the Yeates School of Graduate Studies that outlined program descriptions and learning outcomes, an analytical assessment of the program, program data including data from student surveys and the standard data packages. Course outlines and CVs for full-time faculty members were also appended.

Two external and one internal arm's-length reviewers were selected from a set of proposed candidates. The Peer Review Team (PRT) for the Periodic Program Review (PPR) of the Master's programs in Building Science consisted of Dr. Radu Zmeureanu (Concordia University), Dr. Panagiota Karava (Purdue University), and Dr. Medhat Shehata (Ryerson University).

The appraisal committee spent two days at Ryerson. The visit included interviews with the University and Faculty Administration including the Provost and Vice-President Academic, Vice-Provost Academic; FEAS Dean, FEAS Associate Dean, Vice-Provost and Dean Yeates School of Graduate Studies (YSGS); Associate Dean YSGS, Graduate Program Director of Building Science Graduate Program, and meetings with Faculty, a group of current students, and support staff.

The PRT site visit was conducted on December 4 and 5, 2017. The PRT report was communicated to the Associate Dean, YSGS on January 9, 2018, and the response to the report from Building Science was communicated on February 8, 2018.

Program Strengths and Opportunities

The Peer Review Team identified program strengths and opportunities in their report.

- Unique discipline at Ryerson and in Ontario, acting between architecture and engineering, and contributing to both disciplines. Currently the program is housed in the Department of Architecture, which is helpful at this stage in the development, offering a unique context of collaboration. However, over the long term, and supported by success in research and graduation of MAsc, MBSc and PhD students, the program might look at the creation of its own department.
- Through the specificity of this discipline and collaboration with the AEC industry, the program could become a hub of innovation and entrepreneurship at Ryerson.
- Multidisciplinary faculty.
- Robust admission process, with the acceptance of students from different backgrounds.
- Experiential learning opportunities through close industrial collaboration for research and teaching, part-time instructors, case studies, and research projects.
- Students can complete the MBSc program in one year (three continuous academic terms).
- Small-size classes.

The visiting team realized that the faculty made very honest and critical comments, noting that some of the issues listed in the report have already been apparently solved. As a new program, the Building Science Graduate Program should increase over the short-term the critical mass of students beyond the proposed capacity of 20 students. The Building Science Laboratory should expand in the available space. The concept of the Campus as a laboratory should be encouraged. The opening of PhD program along with the expansion of the MAsc and MBSc degrees would help creating a hub of knowledge at Ryerson, and would generate more industrial collaborations.

Summary of PRT Recommendations with Graduate Program and YSGS Responses

Academic Recommendations

Recommendation 1: Establish a PhD in Building Science.

Building Science Response

Agreement. Building Science will continue the ongoing process of developing a PhD in collaboration with FEAS and YSGS. The program has received authorization from the Provost to proceed with the development of a full proposal for a PhD degree (January 2018). The proposal is currently under development.

YSGS Response

YSGS supports the program response.

YSGS will continue to offer support throughout the process of developing the PhD proposal, per Policy 112.

Recommendation 2: Conduct an analysis of changing the MBSc in Building Science degree from 3 to 4 terms. This will include an examination of the role of the MRP.

Building Science Response

The Building Science program will form a committee for the examination and analysis of the reasons for time to completion issues, exploration of options for moving forward and development of a plan for implementation. The committee will engage with faculty, current students, alumni, FEAS and YSGS to understand the benefits and drawbacks of various solutions and make an informed decision for the benefit of the program.

YSGS Response

YSGS supports the program response.

YSGS will support the program as needed for any minor or major curriculum modifications, per Policy 127.

Recommendation 3: Develop an industrial research chair.

Building Science Response

Agreement. The program will work with industry and the Research and Innovation Office (FEAS) to plan milestones required to achieve this goal.

YSGS Response

YSGS supports the program-level response.

YSGS notes, however, that the development of an industrial research chair is outside its purview.

Administrative and Financial Recommendations

Recommendation 4: Further develop the Building Science laboratory.

Building Science Response

Agreement. The program will continue ongoing efforts, including: (i) transferring the building science lab technician position to permanent status, (ii) optimizing space and equipment usage, (iii) engaging students and industry.

YSGS Response

YSGS supports the program-level response.

YSGS notes, however, that the transfer of the lab technician position to permanent status is outside its purview. YSGS encourages the program to consult with the Dean of FEAS on this issue.

Recommendation 5: Further develop outreach and recruitment strategies.

Building Science Response

Agreement. The program will continue and expand ongoing efforts, including: (i) expanding targeted recruitment to universities in Western Canada and (ii) develop and grow the program's online presence.

YSGS Response

YSGS supports the program-level response.

Implementation Plan

Academic Recommendations

PRT Recommendation	Proposed Action	Responsibility to Lead Follow Up	Timeline for Addressing Recommendation
Establish a PhD in Building Science.	Currently in the process of developing a proposal for a PhD in Building Science.	Associate Chair, Graduate Studies, Building Science	Program launch expected Fall 2019 upon approval
Conduct an analysis of changing the MBSc in Building Science degree from 3 to 4 terms. This will include an examination of the role of the MRP.	Strike a committee of the GPC to initiate analysis. Prepare a recommendation to GPC for voting.	Associate Chair, Graduate Studies, Building Science	May 2019
Develop an industrial research chair.	Strike a committee of the Associate Chair to work with RIO to develop IRC proposal.	Associate Chair, Graduate Studies, Building Science	September 2019

Administrative and Financial Recommendations

PRT Recommendation	Proposed Action	Responsibility to Lead Follow Up	Timeline for Addressing Recommendation
Further develop the Building Science laboratory.	A committee chaired by the Associate Chair has already been struck and meets regularly to address this recommendation.	Associate Chair, Graduate Studies, Building Science	Currently ongoing
Further develop outreach and recruitment strategies.	Associate Chair and Graduate Program Administrator to work with Associate Dean, Graduate Research (FEAS) to further develop ongoing recruitment.	Associate Chair, Graduate Studies, Building Science	Currently ongoing Additional recommendation by September 2018 for 2018/2019 recruitment cycle.

A report on the progress of these initiatives will be provided in the Follow-up Report which will be due in one year from the date of Senate approval.