FINAL ASSESSMENT REPORT **Evaluation of Graduate Programs Faculty of Engineering** Cyclical Review Period: 2019–2020 Date: February 3rd, 2021

I. **Evaluated Programs**

- Master of Engineering in Engineering Management
- Graduate Diploma in Engineering Management

II. **Evaluation Process**

- The final evaluation report of the above-mentioned programs is based on the following documents: (a) the self-evaluation brief produced by the academic unit, (b) the report of the two evaluators following their virtual visit, and (c) the joint comments of the Dean of Faculty of Engineering, Jacques Beauvais, the interim Dean of the Telfer School of Management, Wojtek Michalowski, the Program Director, François Robitaille, and the Program Co-director, David Large, on the aforementioned documents.
- The site visit, which took place on October 13, 2020, was conducted by Dr. Philippe Mabilleau, Université de Sherbrooke, and Dr. Michael Lipsett, University of Alberta.
- During the site visit, the external evaluators met with Claire Turenne-Sjolander, Viceprovost, Graduate and Postdoctoral, the Program director, François Robitaille, the Program co-director, David Large, from the Faculty of Engineering: Jacques Beauvais, Dean, Liam Peyton, Vice-Dean (Graduate Studies), as well as David Taylor, Vice-Dean (Quality Assurance and Teaching Innovation). The external evaluators also met with the academic administrator, an academic officer and the science and engineering librarian. Finally, the evaluators met with students and alumni, full-time and part-time professors. The internal delegate, Rose Martini, attended all the meetings.

Comments from the Internal Delegate

- As internal delegate, I participated in 7 online Microsoft Teams meetings with the external evaluators and various members of the Faculty and Program. All meetings took place in positive, constructive, and cooperative atmosphere. Below are certain main points that were communicated in the various meetings.
- Meeting with Program co-directors & Vice-Dean graduate studies: There was a transparent and open discussion around the need for a marketing strategy that is specifically targeted for the program, particularly the online one. Challenges and strategies to be implemented around succession planning were also discussed, as well as the dilemma around attracting sufficient francophone students into the program.
- Meeting with Administrative Support & Academic Staff, Library: Recognition by Co-Directors and Vice-Dean of the importance of maintaining good communication between the two faculties (Engineering and Management) and the crucial role the administrative personnel play to make this happen. The ability to anticipate needs and make a business case for program's need to central administration is a real strength. There was also

recognition of the role of the librarian in supporting the students in the program. The librarian reported that this support could be enhanced by having the librarian involved in the program as a whole (vs course by course) as this would provide him with a better idea of needs and have students view the learning and application of search skill as more than just to meet the requirements for a particular course. The support and academic staff also communicated the need to have their own administrative unit and be recognized as a primary program.

- Meeting with Students & Alumni: Several students reported that they chose this program because it is like an MBA, but more focused and more relevant to engineers and engineering. They identified that there is a lot of repetition between various courses (e.g., Maslow's hierarch of needs taught in 3 different courses) which they feel takes time away from new learning. On the other hand, some introduction courses (e.g., managerial accounting) the expectations are too high level (as many students do not have an accounting background, particularly when they come from an engineering background). One student reported that the consulting project is difficult to do when working full time for a company. Others reported that the program would benefit from "real life experience" component, such as a CO-OP option. Students verbalized that they would like to see more professional networking opportunities, though recognized that this might be a challenge given that students come from a variety of engineering disciplines. Finally, all students reported feeling welcome in the program and find that the program embraces diversity very well.
- Meeting with Full-time Professors: Professors confirmed that accounting, management, and finance course should be mandatory. They added that a marketing course should also be mandatory as there is need to prepare students to understand how marketing works. They reported that external speakers are a highlight for students, oftentimes aiding with linking practical to theoretical content. There was discussion around the need to have their own primary administrative unit and hire people whose research is in engineering management. This would help with creating common foundational principles and lessen fragmentation of program and courses. Also highlighted were the fact that this program is not just another MBA, nor does it train engineers, but rather focuses on "engineering" management. The challenge of the feasibility and aim of the consultation project (management in an entirely engineering situation) in a time-constrained situation was also discussed.
- Meeting with Part-time Professors (1st and 2nd sessions): To better prepare student to join the workforce as engineering managers, need to have more real cases from the community, more guest speakers, and more projects from the private sector. There is a need to increase the managerial aspect of the program. Suggestion to encourage students to looking into the PMP certificate (include possibility of attaining this certificate in the marketing of program). The delivery of the program can be challenging due to the variability in students' foundational knowledge. It is very challenging to do Finance course in 6 weeks. Also, communicated that they would like more opportunities for cosupervision. Finally, the timing of contracts was identified as an issue, oftentimes these

- are signed barely before course begins which makes it difficult to prepare/access Brightspace.
- In summary. Everyone present at meetings (including students) were very engaged and knowledgeable about the program and readily answered evaluators' questions with necessary details. In each meeting, careful attention was given to obtaining each person's perspectives and opinions.

III. Summary of Reports on the Quality of Programs¹

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

EMPHASIZING THE STRENGTHS AND IDENTIFYING CHALLENGES

STRENGTHS

- Students like the program and feel that the instructors are doing a good job on teaching courses.
- Course instructors like teaching the courses and generally deliver good instruction.
- Program directors have been very effective.
- Support staff is excellent and motivated.
- Strong communication between the Telfer School of Management and the Faculty of Engineering.
- The program has made substantial improvements since the last cyclical review.
- There is a culture of continuous program improvement.
- The program increasingly attracts high-quality students.

CHALLENGES

- Some compulsory courses are not always available before specialized courses.
- There could be more opportunities to apply skills, such as research projects.
- Students feel somewhat disenfranchised and feel that they are not getting the full experience of being trained as engineering managers.
- There is not a strong sense of community amongst students or instructors.
- Faculty members do not always feel that their contributions to the program are valued.
- The program appears to be under-resourced in administrative support and student support services, especially for international students.
- There appears to be no research in engineering management.
- The program is not known to industry or best students.

¹ Based on every document prepared during the assessment process.

IV. Program Improvement²

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.

PROGRAM OBJECTIVES, LEARNING OUTCOMES, MANDATE AND UNIVERSITY PLAN

Recommendation 1: The GPEC recommends that an analysis be made to assess the possibilities of creating an academic structure, such as an engineering management department, to host the programs.

Recommendation 2: The GPEC recommends that new faculty hires should conduct research in engineering management.

CURRICULUM AND STRUCTURE

Recommendation 3: The GPEC recommends that course offering be improved to ensure that compulsory courses are always available before specialty courses.

Recommendation 4: The GPEC recommends that measures be taken so that part-time professors can be involved in discussions of a pedagogical nature.

Recommendation 5: The GPEC encourages the program to continue its efforts to offer additional programming in French, along with marketing the program to French-language students, both domestically and internationally.

Recommendation 6: The GPEC recommends that the unit consider implementing a thesis-based program as a complement to the existing program.

TEACHING AND EVALUATION

Recommendation 7: The GPEC recommends that instructors include additional practical and experiential course components where possible, including mini research projects and guest lectures.

STUDENT EXPERIENCE AND GOVERNANCE

Recommendation 8: The GPEC recommends continuing efforts to make the student association more dynamic. For instance, by advertising the association to incoming students each year.

RESOURCES

Recommendation 9: GPEC commends the directors for the very good progress that has been made towards the revitalization of the program. The members recommend that the unit develop a succession plan to ensure the long-term sustainability of the program.

² Partially based on the External Evaluators Report.

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

All courses have been offered at least once in the past three years.

VI. Conclusion

The external evaluators found that the Engineering Management programs bring "significant value in training multidisciplinary practitioners in valuable applied management methods, with benefit to both the private sector and the public sector". These programs meet the standards of the discipline. Their greatest strengths are their interdisciplinary nature, strong leadership, and a culture of continuous program improvement.

Given this very positive assessment of the program, the members of the Committee thank all the participants in the program evaluation. They commended the rigour of the work accomplished and emphasized the quality of the self-evaluation reports and the external evaluators.

Schedule and Timelines

A meeting will be organized with the program directors, 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 (GPEC) 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 2026–2027. The self-study brief must be submitted no later than June 2026.

Université d'Ottawa

University of Ottawa

Master of Engineering/Graduate Diploma in Engineering Management

Evaluation 2019-2020
Action Plan
March 2022

Faculté / Faculty: Faculty of Engineering

Département / Department: Collaborative – Engineering and Telfer School of Management

Programme(s) évalué(s) / Program(s) evaluated: Master of Engineering in Engineering Management / Graduate Diploma in Engineering Management

Cycle d'évaluation / Cyclical review period: 2019-2020

Date: 04.03.2021

Preamble:

A series of Expected Results and Implementation Indicators were submitted by the Co-Directors of the Master of Engineering/Graduate Diploma in Engineering Management Program (EMP) in response to 9 Recommendations (organized into 5 Focus Areas) presented in the Cyclical Review results. The expectation was, and continues to be, that the program would evolve as the Program aligned with these recommendations. The outcome is anticipated to be a more defined program structure and consequently, enhanced program quality.

In May 2021, a cost-recovery online version of the Master and Graduate Diploma was created that is marketed to working Canadians across Canada who wished to complete the program remotely, part-time while they continued to work. This is named the Master of Engineering Management Online (MEM).

In July 2021, the Co-Directors were replaced by a Director, Graduate Programs in Engineering Management with a mandate to carry on managing and evolving both the online (MEM) and on-campus (EMP) graduate Engineering Management Programs. This progress report is based upon the Director's assessment of market and student needs, available and accessible resources and the capabilities of the faculty.

It has been structured to build upon the original Action Plan for ease of understanding.

FOCUS AREA #1: OBJECTIVES

Recommendation 1: The GPEC recommends that an analysis be made to assess the possibilities of creating an academic structure, such as an engineering management department, to host the programs.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
None – already fulfilled. EMP and MEM programs now under new School of Engineering Design and Teaching Innovation (SEDTI), Faculty of Engineering.	N/A	N/A	N/A	N/A	N/A	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

The graduate programs in Engineering Management (EMP & MEM) are now administered by the new School of Engineering Design and Teaching Innovation as indicated.

An on-line Masters of Engineering Management (MEM) Program (and companion Graduate Diploma), targeting a national market has been launched and continues to add courses. MEM has been structured into Compulsory and Concentration Areas (data analytics, project management, product innovation and management and operations management). The intent is to emulate the MEM structure in EMP with a Compulsory set of courses and thematic optional courses mirroring those of the MEM program.

As part of this process, four additional elements are under investigation:

- Identification of stronger linkages with other programs in SEDTI and with Telfer School of Management to include relevant optional course offerings.
- Development of a compulsory integrative business case offering
- Development of an integrative capstone (practicum) to allow students to apply their learnings
- Creation of an environmental technology theme (three courses)

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FOCUS AREA #1: OBJECTIVES

Recommendation 2: The GPEC recommends that new faculty hires should conduct research in engineering management.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Create core group of 5 FT tenure-track positions specialized in Engineering Management over 3 years. Recruit existing professors who already do research in engineering management to participate who are already part of Telfer and Faculty of Engineering. Propose new hires for SEDTI (especially as interdisciplinary positions sponsored jointly by Telfer and Engineering)	1 - Urgent	Jacques Beauvais, Dean, Engineering; Hanan Anis, Director, SEDTI; Jac van Beek, Director (EMP&MEM)	July 2024	5 FT tenure-track professors delivering core or optional courses for the EMP or MEM programs related to their research.	2 FT tenure-track professors recruited each year over the next 2 years, and 1 FT tenure-track professor recruited in the following year.	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

EMP faculty are predominantly PT status. Several steps are being taken to change this profile:

- FT Faculty from Telfer School of Management and Faculty of Engineering are being recruited to teach courses in EMP & MEM programs as they develop and choose their annual workload commitments
- The Faculty of Engineering and Telfer School of Management are working to update the current Memorandum of Understanding to delineate how faculty will be able to collaborate on research related to engineering management and participate in the development of the EMP and MEM programs (exploring internships, cross-course listings, microprograms and optional courses, student case competitions, inclusion of engineering management courses into

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faculty teaching workload and synergies with the Digital Transformation and Innovation program and Systems Science and Engineering programs which are also interdisciplinary between Telfer and Engineering)

- Up to three FT positions under consideration, all would include teaching and research commitments:
 - o 1 cross-appointment FT faculty (Telfer/Faculty of Engineering) is under consideration by the two Deans
 - o 2 proposed FT tenure-track positions are under consideration by the Dean, Faculty of Engineering, possibly proposed jointly with Telfer as interdisciplinary positions.
 - o 2 FT professors (1 from each faculty) participating in the development of courses for the MEM program

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Recommendation 3: The GPEC recommends that course offering be improved to ensure that compulsory courses are always available before specialty courses.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
None – already fulfilled. Compulsory courses in MEM and EMP are offered every semester (including summer)	N/A	N/A	N/A	N/A	N/A	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

The program has complied.

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Recommendation 4: The GPEC recommends that measures be taken so that part-time professors can be involved in discussions of a pedagogical nature.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Create an academic program committee consisting of a mix of FT and PT faculty to advise on program evolution, key program linkages and workload preparation. Provide guidance for the better integration of PT profs in programs.	3 - Advised	Jac van Beek, Director of Engineering Management Programs; Liam Peyton, Vice-Dean Graduate Studies, Engineering	September 2023	PT profs play a major role in delivering courses. As such, their tasks should extend beyond strict contact hours so that they may be involved in discussions of program objectives, curriculum, etc.	Clear guidance and recommended practice for a better integration of PT profs into academic programs and units.	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

Academic program committee already in place for the planning, development and delivery of online courses for the MEM program, which includes both FT and PT faculty. The Director is expanding the mandate of the committee to include oversight and consultation on all aspects of both the MEM and EMP program including synergies for research.

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Recommendation 5: The GPEC encourages the program to continue its efforts to offer additional programming in French, along with marketing the program to French-language students, both domestically and internationally.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Assess demand for EMP/MEM/GNG courses in French, approaching - Graduate office & Institutional research (EMP, GNG) - International office (EMP, GNG) - Keypath (MEM) If above conclusive: Create 2 EMP, MEM and relevant GNG courses in French per year. Once sufficient courses are offered, create and launch EMP Graduate Diploma and Master's in French.	3 - Advised	Jacques Beauvais, Dean, Engineering; Liam Peyton, Vice-Dean Graduate Studies, Engineering; Hanan Anis, Director, SEDTI; Potentially: Stéphane Brutus, Dean, Telfer.	September 2026	Clear assessment of demand for French courses - on campus - online If above conclusive: Graduate diploma and Master's degree in Engineering Management, offered in French.	If assessment of demand supportive: 2 viable EMP, MEM and relevant GNG courses created each year and offered each year, with a minimum of 10 students registered.	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

The Director is cooperating with the International Office, Faculty of Engineering and Telfer School of Management as they explore targeted opportunities with specific countries in la Francophonie to deliver the MEM programs remotely to students in those countries, or to partner in an on-location version of the EMP program. The Director is also exploring with our partner Keypath Education the market demand for a French offering of the MEM program nationally.

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Recommendation 6: The GPEC recommends that the unit consider implementing a thesis-based program as a complement to the existing program.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Create MASc degree in Engineering Management	3 - Advised	Jacques Beauvais, Dean, Engineering; Liam Peyton, Vice-Dean Graduate Studies, Engineering.	September 2026, contingent to the recruitment of 5 FT tenure-track profs specialized in Engineering Management.	MASc in Engineering Management	Program launch	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

The Director will explore synergies between the existing M.Sc. in Systems Science and Engineering, and the existing M.Sc. in Digital Transformation and Innovation now that these programs are also part of the new School of Engineering Design and Teaching Innovation. Some research related to engineering management is being done as part of the PhD in Digital Transformation and Innovation. The feasibility of augmenting existing thesis-based programs (DTI, Telfer, for example) is an interim step while the program attracts more FT faculty to the roster of instructors and explores the feasibility (need) of establishing a research program and defines it's focus.

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FOCUS AREA #3: TEACHING AND EVALUATION

Recommendation 7: The GPEC recommends that instructors include additional practical and experiential course components where possible, including mini research projects and guest lectures.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Invite guest speakers in 50% of courses.	3 - Advised	EMP program co- directors	September 2025	Guest speakers in 50% of courses.	Guest speakers in 50% of courses.	
Include case studies in all courses.				Case studies in all courses.	Case studies in all courses.	To be completed by the Evaluation Committee when reviewing the progress report
Create co-op program.				Co-op program launched.	Co-op program launched.	

Director's Comment:

The concentration of PT faculty drawn from industry already provides a practical perspective in many classrooms. Guest speakers and case studies strengthen the student's exposure to a practical and/or experiential element in courses. Students now have the option of doing a GNG 5902 Industry Internship Project and the EMP program is registered with the federal government as a recognized COOP/Internship program so students are eligible for COOP and Internship work-terms in industry. In addition, the Director is working to:

- Establish a business case development course which would include participation in a multi-discipline student business case competition.
- Encourage integration of more simulations into courses

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FOCUS AREA #4: STUDENT EXPERIENCE AND GOVERNANCE

Recommendation 8: The GPEC recommends continuing efforts to make the student association more dynamic. For instance, by advertising the association to incoming students each year.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Associations and support groups for graduate students exist at Faculty level (Engineering) namely the Graduate Engineering Students Professional Development Club (GES-PDC).	2 - Important	EMP program co- directors	September 2021, and regularly onwards onwards.	Awareness of GES-PDC from all EMP & MEM students.	One email covering GES-PDC sent to all EMP/MEM students, twice per semester. Mention of GES-PDC on all EMP & MEM websites. Visit of EMP	To be completed by the Evaluation Committee when reviewing the progress report
Better advertisement is warranted.					representative in course EMP5100, every semester.	

Director's Comment:

Fulfilled.

Both the Engineering Management Student association and the GES-PDC are now well established, active and linked with events and activities scheduled every semester.

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FOCUS AREA #5: RESOURCES

Recommendation 9: GPEC commends the directors for the very good progress that has been made towards the revitalization of the program. The members recommend that the unit develop a succession plan to ensure the long-term sustainability of the program.

Define the actions to undertake	Priority Level*	Assigned Person or Persons	Deadline to attain the objective	Expected results	Implementation Indicators	Progress on the actions taken: accomplished, to be sustained, to be continued, to be developed
Identify program co- directors from Engineering and Telfer.	1 - Urgent	Jacques Beauvais, Dean, Engineering; Hanan Anis, Director, SEDTI; Stéphane Brutus, Dean, Telfer.	July 1, 2021	Program co-directors identified.	Program co-directors identified.	To be completed by the Evaluation Committee when reviewing the progress report

Director's Comment:

Fulfilled.

A new Director, Graduate Programs in Engineering Management has been hired and actively managing and promoting the program since July 2021. He brings 30 years experience as a PT professor at Telfer School of Management and a career in research management, technology development management.

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