

# Program Review: One-Year Follow-Up Report

## Engineering

Faculty Name	Faculty of Arts, Science and Management
Date Submitted	April 28, 2025 (Draft)
Submitted by	The Engineering Foundation Certificate faculty members

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### A. Overview

There has been significant work towards the Action Items identified in the Engineering Program Final Report and Action Plan submitted 2023. There have also been several new College-wide goals arising from the Quality Assurance Process Audit (QAPA) that occurred in November of 2023 that are being addressed as part of the Engineering Foundation Certificate Program Review work. Most of the work towards these goals is either completed or underway (see Appendix I).

Because all the core Engineering Foundation Certificate courses and the faculty that teach them are part of the Math-Science department, much of the work outlined in the Math-Science Program Review One-Year Follow Up report, such as the development of departmental Vision, Mission, and Values statements (see Appendix II), and a departmental professional development plan is also applicable to the Engineering program. Alongside that work we have written Program Learning Outcomes and done Curriculum Mapping work that is specific to the Engineering Foundations Certificate. The Program Learning Outcomes can be found in Appendix III and the Curriculum Mapping work will be discussed in Section D. Engineering Foundation Certificate Graduate Attributes were added to the information on the program webpage even before our action plan was finalized.

The Engineering Foundation Certificate admission requirements were adjusted so that, as of the 2023/24 academic year, students were able to complete some upgrading courses while enrolled in the program. This has increased the number of students officially enrolling in the Engineering Foundations Certificate as opposed to just taking the engineering program courses under the University Studies program.

A significant number of the courses in the certificate (CHE 110, CHE 111, CHE 152, ENR 100, ENR 101, ENR 190, MAT 181, MAT 182, PHY 120, PHY 121) have had their learning outcomes revised in consultation with the Center for Teaching and Learning Innovation (CTLI) and brought up to current standards. Four of those courses (ENR 100, ENR 101, PHY 120, PHY 121) have also been updated to better align with the First-Year Common Engineering Curriculum set out in <https://www.bccat.ca/pubs/Reports/EngCommonCore2018.pdf> in 2018. One course, ENR 190, was added to give students the chance to complete a work term as part of their certificate. We are awaiting resources from the Dean's office to offer this course, in coordination with the work integrated education department.

Work was begun to set up an Engineering Program Advisory Committee. A draft of the terms-of-reference was sent to the dean in the spring of 2023 and several community members were approached to determine their interest in participating. While interest from the local engineering community was high, we were advised to put the program advisory committee work on hold until a college-wide policy on program advisory committees was written. As of the submission of this report we are still awaiting the creation of that policy.

## B. Impacts on Program Structures

Since receipt of the Dean's feedback on the Engineering Final Report in April 2023 and the Math-Science Department Final Reports in November 2023, we have completed Foundational Action Items to build the framework upon which to develop our programs with a cohesive, evidence-based approach. Specifically, in chronological order we have:

- Developed spreadsheets to track progress on Action Plan goals (December 2023)
- Developed Department Mission, Vision, and Values statements (April 2024)
- Developed Program Learning Outcomes for the Engineering Foundations Certificate (written April 2024, approved at Education Council October 2024)
- Completed Curriculum Mapping for all courses and programs in the department (Dec. 2024)

From this foundation, future actions relevant to Program Structures include:

- Analyze the program curriculum map to determine strengths and gaps in coverage of Program Learning Outcomes and determined changes that can be made to curriculum to address the gaps. (Jan – April 2025)
- Update learning outcomes on courses that have not been updated within the last two years, with a goal to link them more closely to Program Learning Outcomes (2025 – 2026)
- Upon creation of an NIC Program Advisory Committee Policy, review and revise our existing draft Program Advisory Committee Terms of Reference, recruit members and commence meetings

## C. Impacts on Teaching and Learning Practices

### Professional Development Planning and Reporting

The Math-Science department has a culture of continual improvement of our skills and knowledge to promote high quality teaching. Most faculty regularly participate in professional development (PD) activities to learn and then implement their learning. The department has had annual "PD sharing" events for the past few years. However, structures did not exist to support consistent PD planning and reporting. Starting in September of 2024, a new PD Plan was provided by the Dean's office. This tool encouraged development of department-wide PD goals for the first time, to unite faculty in the department around a small number of activities, in addition to their personal PD goals.

In addition to this, all professional engineer (P.Eng.) faculty are required to complete 60 hours of professional development on a three-year rolling average to maintain their professional status. The professional development required of engineers includes content in ethics, regulatory, technical, and leadership and communication skills. This is required by the Professional Governance Act of BC and is administered by Engineers and Geoscientists BC.

### Survey of Faculty PD Activities

In December 2024, the Math-Science department delivered an anonymous survey of our faculty to gain quantitative evidence to describe current engagement in PD activities and participation in End of Course Surveys. Participation was high with completion by 16 out of 18 faculty members who were hired within the department at the time. Key findings from this survey demonstrate:

- 60% of our faculty annually attend 4 or more PD events put on by our Centre for Teaching, Learning and Innovation (CTLI)
- 33% of our faculty have attended some PD events put on by CTLI, at least once
- 67% of our faculty's dominant PD activities relate to teaching and learning, with the same percentage having implemented changes in our courses because of these PD activities

- 67% of our faculty dedicate at least some portion of their PD time towards staying current in their content area over the past year, while 13% prioritized their PD time in this area

### **Department specific PD**

A college-wide and department PD goal for 2024-25 is to address the use of AI tools in teaching, learning and assessment. Aspects of AI that faculty are encouraged to learn about include:

- How can faculty use these tools to help them in their work
- How can faculty incorporate the use of AI tools to teach students how to use them
- How will faculty address the use of AI tools by students in the course assignments

While the Centre for Teaching, Learning and Innovation (CTLI) has resources available, the department has organized a workshop to share our collective knowledge on these AI topics and brainstorm how to implement changes to curriculum to increase instructor and student proficiency with these tools (May 2025). Several department faculty members have participated in CTLI's 'Assessment in the Age of Artificial Intelligence' PD sessions, as well as the 'NIC GenAI Exploration Group' learning community.

### **Course Surveys of Student Feedback**

While many instructors have been soliciting student feedback for years, CTLI standardized an End-of-Course survey, relating to students' experience of course content and delivery, beginning in the 2023-24 academic year. Mid-course surveys became available in 2024-25. Most Math-Science instructors opted in to the standardized End-of-course surveys. An anonymous poll was conducted in November 2024 to determine our department's level of participation in this voluntary program. The findings were as follows:

- Fall 2023 – 62.5% (19% were on leave or not teaching)
- Winter 2024 – 75% (12.5% were on leave or not teaching)
- Fall 2024 – 81% (6% were on leave or not teaching)

Challenges occurred around communication of end-of-course feedback surveys' accessibility and availability, such that many courses had fewer than the minimum required number of participants to see reports, but procedures were improved based on feedback to CTLI.

Our faculty have found a variety of benefits from completing these surveys, including the following (percentages reflect the number of faculty who chose this option, from a multi-select list, when asked what some of the benefits are from participating in course feedback surveys):

- Learning what best supports students (73%)
- Learning that students are variable in their learning and teaching preferences (67%)
- Improving subsequent semesters (67%)
- Confirmation of effective teaching practices (53%)
- Learning about which learning practices are most and least effective (47%)
- Makes me feel good (40%)

### **Provincial Articulation Committee Participation**

Participation of NICs Math-Science faculty in Provincial Articulation Committee meetings allows faculty to ensure curriculum supports a high degree of mobility of BC post-secondary students. Additional benefits include subject-specific teaching and learning opportunities, and collegiality with colleagues at other institutions, which support activities like External Program Reviews.

Faculty from the Math-Science department who teach courses in the Engineering Foundations Certificate attend the annual meetings for these Provincial Articulation Committees:

- **Chemistry**
- **British Columbia Committee on the Undergraduate Program in Mathematics and Statistics (BCcupms)**
- **Physics and Astronomy**
- **Engineering**

## **D. Impacts on the Student Experience**

### **Program Learning Outcomes (PLOs) and Curriculum Mapping**

As a department we developed mission and vision statements to unite us in a common goal, and those of us working in the Engineering program met separately to write our own Program Learning Outcomes. These program learning outcomes were endorsed by the Center for Teaching and Learning Innovation and approved by the Education Council in October of 2024.

Curriculum mapping provides detailed information about how our courses ensure students meet our PLOs and identifies gaps where the curriculum does not fully meet PLOs. While much of the initial curriculum mapping work, such as entering all of the courses and course learning outcomes (CLO) into the system, was done jointly with the Math-Science department, mapping the CLOs to the Engineering Foundation Certificate Program learning outcomes was done separately. This work was completed in December 2024. The only courses not included in this Curriculum Mapping exercise are the required English courses. The English department has not yet done any curriculum mapping and so that information is currently unavailable. It can be reasonably assumed that these CLOs of these English courses would mostly apply toward the PLO addressing communication

The Curriculum Mapping activity demonstrated that our courses meet our PLOs in these areas (refer to Appendix III - Program Learning Outcomes) (see Figure 1):

- Communication – “Communicate effectively with written and spoken language, and with technical drawings and sketches.”
- STEM – “Apply mathematics, science and technology skills and knowledge gained in program courses to solve real-world problems.”

More work could be done to increase the number of courses in the program which address teamwork and leadership skills.

The small number of CLOs which address the following PLOs is mostly due to the Engineering-specific nature of these PLOs.

- Ethics – “Conduct themselves in a professional and ethical manner in academic and professional environments, consistent with Engineers and Geoscientists of British Columbia (EGBC) code of ethics.”

- Reconciliation – “Explain Engineering and Geoscientists of British Columbia’s commitments to reconciliation and decolonization in the engineering profession.”
- Roles and Responsibilities – “Describe the roles and responsibilities of engineers in society.”

Only the two Engineering courses (ENR 100 and ENR 101) fully address these to the level specified and, when we performed this exercise, the CLOs in the general math and science courses were not considered to be aligned. This highlights the need for more discussion with the instructors of the general math and science courses on what is considered professional and ethical behavior in the EGBC code of ethics. It is possible some of the CLOs in the non-engineering-specific courses would align if the criteria was better understood.

Because the data entry work for the Curriculum Mapping exercise began before the proposed PLOs had been discussed at the Education Council table, one additional PLO related to Indigenization and Interculturalization that was added as a result of that discussion was not included in the mapping:

- Indigenization and Interculturalization – “Apply intercultural and local Indigenous perspectives in meaningful and respectful ways in relation to the program.”

Including this PLO in future mapping work might better capture the number of CLOs which address reconciliation and Indigenization but do not specifically address the EGBC’s specific commitments to reconciliation and decolonization.

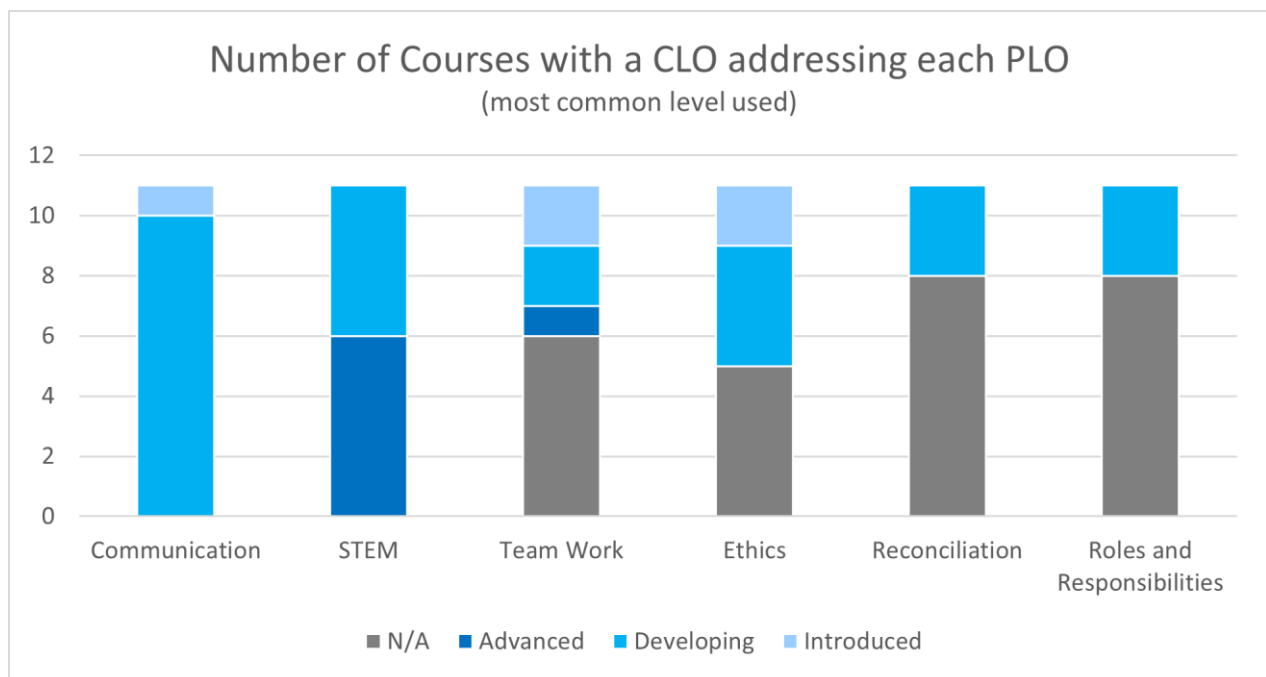


Figure 1: Graph showing the number of courses that have at least one Course Learning Outcome (CLO) that address each PLO. Many courses have more than one CLO that address each PLO. In those cases, the level assigned to the course is the most frequent level of alignment of the CLOs with each PLO. Notes: The required English course are not included as that department has not yet completed their curriculum mapping work.

Another challenge we faced while performing this Curriculum Mapping exercise is the one-year duration of the program. With only two terms to complete the program, much of the work to scaffold the students’ learning from “Introduced” to “Developing” to “Advanced” happens within the courses. The abundance of “Developing” level CLOs compared to the “Introduced” CLOs is thought to arise from the fact that CLOs are written to indicate where the

student should be at the end of the course. To try and see if we could better determine the progression of student learning we also plotted the total number of CLOs addressing each PLO. See Figure 2. This does show a larger number of “Introduced” and “Advanced” level CLOs in most cases, but we will need to do more work to determine why the “Developing” level CLOs are so prevalent, and how to address this.

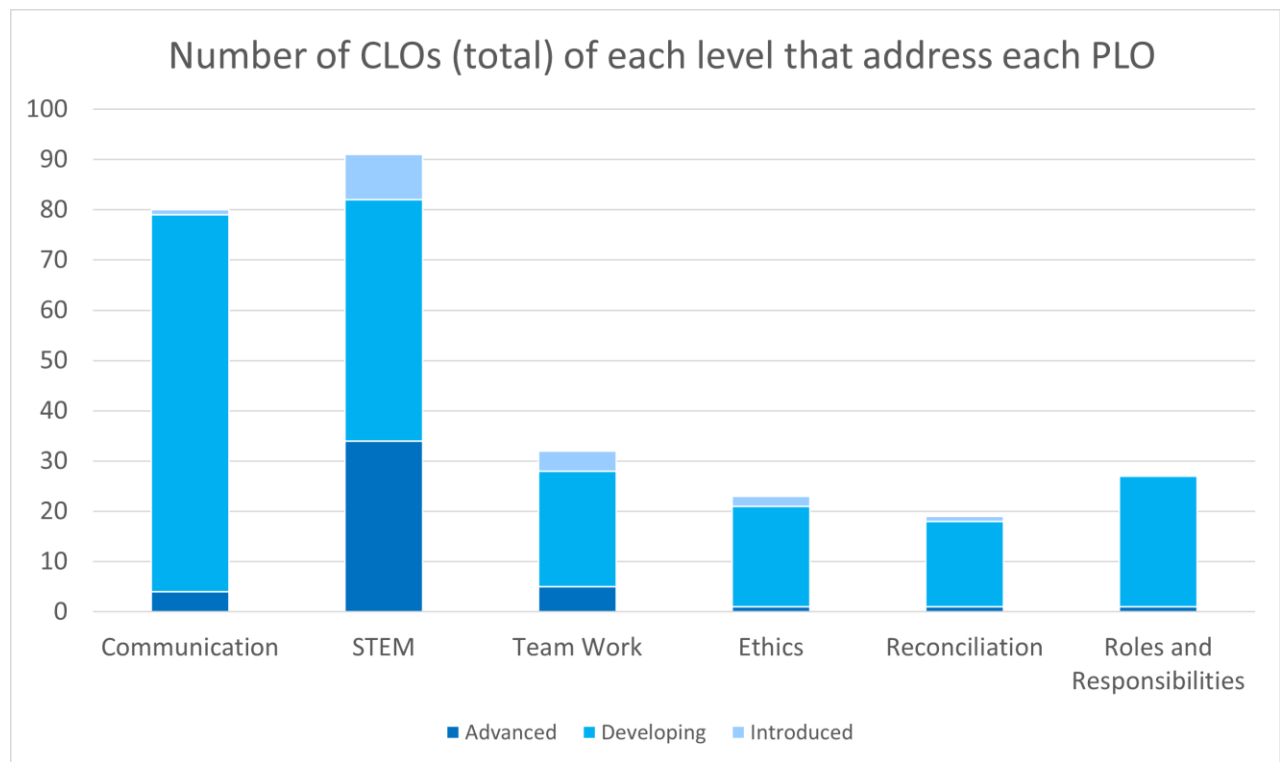


Figure 2: Graph showing all of the CLOs that address each PLO with their level indicated. Notes: The required English courses are not included as that department has not yet completed their curriculum mapping work.

### PLO Alignment with Professional Requirements

The Engineering courses and the calculus-based Physics courses have actively aligned their course content to match the core competencies set forth by the Common First Year Engineering Curriculum established by the BCCAT Engineering Articulation Committee.

### Labour Market Relevance

The [BC Student Outcomes Survey](#) provides input from students one and two years after completing the Engineering Foundations Certificate. The data posted January 2025 (10 respondents) show that 90% of NIC students are satisfied or very satisfied with their education and 90% said the quality of education was very good, good or adequate. The need for skilled workers in engineering has never been more evident in the province. According to the BC Labour Market Outlook 2023-2033, <https://www.workbc.ca/research-labour-market/bcs-labour-market-outlook-2023-edition> 'Architectural, engineering and related service' will generate 22,600 job openings (approximately ½ expansion, ½ replacement) over the next decade, making it a growth sector in the province.

## E. Impacts on Approaches to Indigenization

Much of this work is being done collectively with the rest of the Math-Science department. An explanation of that work, taken from the *One-Year Follow-up Report: Math-Science* is included below in italics.

Engineering specific work that has been done in addition to the broader Math-Science department work is that two of the Program Learning Outcomes that were developed as part of this Program Review exercise specifically address reconciliation and the inclusion of local Indigenous perspectives

By the end of the program students will be able to:

- “Explain Engineering and Geoscientists of British Columbia’s commitments to reconciliation and decolonization in the engineering profession.”, and
- “Apply intercultural and local Indigenous perspectives in meaningful and respectful ways in relation to the program”

We have also begun consultation with NIC’s Indigenous Education Facilitator, exploring a variety of different ways we can satisfy those outcomes. Some suggestions include adding a cultural safety training event for the Engineering Foundation Certificate students similar to what is done in the Island Pre-Health program, and to consider a field trip to a local Big House to discuss its design and construction as part of the PHY 170 course which focuses on static equilibrium in engineering applications.

### ***Progress on Indigenization***

*The Math-Science department has been proactive to implement recommendations of the Truth and Reconciliation Commission’s Call to Action, notably 62ii: Provide the necessary funding to post-secondary institutions to educate teachers on how to integrate Indigenous knowledge and teaching methods into classrooms. We acknowledge that actions toward reconciliation require ongoing education of ourselves as Canadians and educators, and ongoing reflection and renewal of our curriculum to continue to Indigenize our classrooms and curriculum. More specifically, we will work towards Indigenization of the curriculum to include the following learning outcome to all courses, as suggested by the Offices of Indigenous Education and Global Engagement:*

*By the end of the course the student should be able to apply intercultural and local Indigenous perspectives in meaningful and respectful ways*

*To meet this goal, we will work toward:*

- 1. Enhancing our own learning of Indigenous perspectives (people, practices and history) with a goal of becoming “cognizant of the nature of social power and oppression to not repeat the horrors of the past<sup>1</sup>.” We see this as a personal responsibility as Canadians, to work towards reconciliation. While related, we see this personal education as separate from Indigenization of our curriculum.*
- 2. Exploring and incorporating teaching styles, classroom environments, and assessment methods that more closely align with Indigenous principles of learning.*
- 3. Facilitating students’ self-guided learning around Indigenous knowledge and encouraging respectful dialogue and knowledge sharing.*

*The Math-Science department greatly respects the need to incorporate Indigenous practice and content into our curriculum. To that end, the department held a week-long Group PD event to enhance our knowledge of Indigenous perspectives and the local First Nations in May of 2021. While Indigenization was a high priority at that time, since*

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<sup>1</sup> <https://journals.sagepub.com/doi/10.1177/1177180118785382>

then other tasks have had higher priority, including program review, developing program structure, responding to the new, mandatory PD planning and reporting requirements, and addressing the use of AI.

As we complete this One-Year Report, our time can now be refocused on efforts towards Indigenization and Interculturalization. We see this as an ongoing process, with actions, but with no “end point”. To guide this process, we plan to develop a Department Indigenization Plan, in collaboration with the Working Together Working Group.

### **Indigenization of Practice**

We are guided by [First Peoples Principles of Learning](#) as presented by the First Nations Education Steering Committee. Our class sizes are small, allowing us to connect with each one of our students; we know their names and we get to know them and their career and life aspirations. This allows us to implement the principle that “Learning ultimately supports the well-being of the self...” and is relational. We believe these practices meet the needs of ALL learners, not just Indigenous learners. Our End of Course Surveys provide evidence that students feel cared for. Responses to the question “The learning environment was welcoming and supportive” are most numerous in the “agree and strongly agree” category. Comments include statements like “the instructor cares for their students”. Relationships between instructors and students often continue beyond the length of the course, with students connecting years later to share the stories of their career paths. Many of our science courses have labs, which allow us to give students the opportunity for “experiential learning”, which is another First People’s principle of learning.

### **Facilitating Student Learning on Indigenous Knowledge**

Many of our courses already include Indigenous content, including information such as First Nations’ use of natural materials, discussion of methods of information dissemination and ways of learning. Much of this content is collected through students’ individual exploration. A detailed list of current Indigenous content and learning activities was created in our Final Report for Bio and Chem (2023). This list will be incorporated into the Department Indigenization Plan.

The workshops provided by the Offices of Global Engagement and Indigenous Education in the Winter 2025 term to help Indigenize Course Learning Outcomes are very welcome and required to help us navigate this process. Some of our faculty are engaging in these workshops and will be able to share that knowledge with the rest in our June 2025 workshop.

The Working Together Working Group is available, and we plan to work with them to receive their insight in guidance to draft the Department Indigenization Plan, and to help us implement changes.

### **Challenges to Indigenization**

The main challenge with broadening the scope of Indigenization of practice and content has been time. As stated earlier, other College priorities for Program Review, Program Structure creation, and addressing AI have taken priority over Indigenization over the past three years. When this report is complete and all faculty are incorporating AI into practice and teaching, we will be able to redirect department attention to broaden Indigenization in courses that are currently lacking. Indigenization is a goal in our department PD plan; specific actions to implement that goal can be found in the attached action plan.

We are challenged by the conflicting values attributed to the use of knowledge by scientific and Indigenous communities. In science, sharing knowledge is a responsibility and requirement. The body of scientific knowledge grows through social interaction and sharing. A principle of Indigenous Learning is that “Learning involves recognizing



*that some knowledge is sacred and only shared with permission and/or in certain situations,” which conflicts with the scientific training we have had.*

*[The BC Labour Market Outlook 2023 Edition](#) notes that Indigenous communities “value a wide range of activities that are often not captured by labour market methodologies” (p8) As such, as a department we strive to be flexible to fill education needs identified by NIC’s Indigenous Education department in collaboration with Indigenous communities.*

## Appendix I: Timeline of events with summary of actions

January 2022	Engineering Self Study submitted to the dean
February 2022	External Review
March 2022	External Review Report received
April 2022	Deans Response to External Review and Self-Study Recieved
June 2022	Revisions to the CHE 110 – Chemical Principles I, CHE 111 – Chemical Principles II, and CHE 152 – Engineering Chemistry learning outcomes, to bring them up to the improved standards after the creation of the Center for Teaching and Learning Innovation at the college, were approved at Education Council
December 2022	Updates to the Engineering Certificate admission requirements to allow students to do some upgrading of courses while in the program, and to update the program requirements to align with the Memorandum of Understanding for Engineering transfer to UVic approved at Education Council. Engineering Foundation Certificate Graduate Attributes were also added to the program webpage.
October 2022	Draft of Engineering Final Report and Action Plan submitted to the dean for review
March 2023	Dean’s feedback on the Final Report and Action Plan received
May 2023	Meeting with the dean to discuss and clarify feedback
May 2023	Revised Engineering Final Report and Action Plan submitted to the dean
May 2023	Draft Engineering Program Advisory Committee terms-of-reference sent to the dean for approval
November 2023	Revisions to ENR 100 – Introduction to Engineering I and ENR 101 - Introduction to Engineering II, which included an adjustment to the content and learning outcomes and an increase in hours to better align with the First-Year Common Engineering Curriculum agreement, were approved at Education Council.
November 2023	Revisions to MAT 181 and MAT 182 to bring the learning outcomes up to current standards were approved by the Education Council
November 2023	NIC QAPA panel visit. Our Department Chair and one of the Engineering Program faculty attended the whole event.
December 2023	Tracking spreadsheets developed to track Action Plan items; no template available from CLTI or the Dean’s office at this point.
December 2023	New Course ENR 190 – Engineering Work Term I approved by Education Council. This will enable students to complete a work-term as an optional part of their Engineering Foundations Certificate.
December 2023	QAPA Report received by NIC
January 2024	Department meeting <a href="#">MASC Program Review Meeting Notes - Jan 15 2024.docx</a> . New “Foundational Action Items” were identified and prioritized. These new action items are to take precedence over previous Final Action Plan items in both the Math-Science and Engineering plans. While the writing of Program Learning Outcomes was an addition to the Math-Science action items, work on Program Learning Outcomes for the Engineering Program was already underway. The main new additions to the scope of the Engineering program work was the development of departmental Vision, Goals, and Mission statements and perform Curriculum Mapping. Clarification was given that many of our existing action items are outside the scope of Program Review and must be abandoned.

January 2024	Department meeting <a href="#">MASC Program Review Meeting Notes Jan. 30 2024</a> Working groups established for: Mission, Vision and Values; Program Learning Outcomes; Curriculum Mapping. Most of the Curriculum Mapping work for the Math-Science program was also needed to map the Engineering program
February 2024	New “Foundational Action Items” <a href="#">Math and Science Foundation Action Items 02 2024.docx</a> document provided by CTLI based on January meetings, which clarifies the new priorities for action items.
April 2024	Department meeting discussion with the Dean on Mission, Vision and Values, and Program Learning Outcomes. While general agreement exists, consensus was not reached and some details (e.g. examples of HIPS practices) need to be added. Will revisit after curriculum mapping
September 2024	GenAI identified by NIC as a priority action item.
October 2024	Curriculum mapping worksheet completed; Dean’s Office supported insertion of data into UBC site.
October 2024	Updates to the Engineering Foundations Certificate including the addition of Program Learning Outcomes approved at Education Council
October 2024	Engineering student field trip to meet with clients for their ENG 100 design projects related to improving food production on Denman Island: <a href="https://www.nic.bc.ca/about-us/nic-news/news/engineering-students/">https://www.nic.bc.ca/about-us/nic-news/news/engineering-students/</a>
December 2024	Updates to PHY 120 – Principles of Physics I and PHY 121 – Principles of Physics II to update the learning outcomes and to simultaneously reduce the overall course content while better aligning it with the First-Year Common Engineering Curriculum approved at Education Council
December 2024	Curriculum mapping on the UBC site has been completed for all of the Engineering Foundations Certificate courses within the Math-Science Department (the only missing courses sit in the English department and they have not yet completed their Curriculum Mapping work). Session with Center for Teaching and Learning assisted in identifying gaps in linkages between Program Learning Outcomes and Curriculum but also identified limitations of the software and the need to confirm whether apparent gaps are supported by the data.
January 2025	Added a module to ENR 101 taught by the Work Integrated Learning department.
February 2025	The Math-Science One-Year Follow-up Report was submitted to the dean
April 28, 2025	Draft Engineering Foundations Certificate One-Year Follow-up Report submitted to the dean

## Appendix II – Math-Science Department Vision, Goals, Mission Statement and Values

### *Vision Statement:*

We continuously strive to enhance our delivery of high quality and accessible educational experiences in mathematics, science and engineering in a supportive and student-centered environment.

We aim to achieve this by:

1. using innovative and evidence-based teaching practices;
2. applying authentic formative and summative assessments that provide students with agency, choice and autonomy;
3. continuing and striving to incorporate high impact practices;
4. weaving Indigenous knowledge and intercultural connections throughout our programming and curricula; and
5. assuring broad academic transfer opportunities across all our disciplines in BC and beyond.

### *Departmental Goals:*

Over the next 5 years, we aim to do the following:

1. Complete an inventory of quality and evidence-based teaching and assessment practices in mathematics, science and engineering.
2. Identify course redesign and assessment redesign
3. Organize ongoing department professional development
4. Develop concept forms for offering comprehensive one- and two-year post-secondary programs in math, physics, chemistry, and engineering
5. Adopt teaching practices that support student-centered and engaged learning and add authentic formative and summative assessment options to all courses
6. Develop a departmental Indigenization Plan

### *Mission Statement:*

The Math-Science Department is dedicated to fostering student success by igniting a passion for discovery and achieving academic excellence in mathematics, science, and engineering. We cultivate critical thinking, problem-solving, and adaptability, empowering students to excel in future studies and make meaningful contributions in an ever-changing world.

### *Department Values:*

- **Student success:** We are passionate about the success of each student and take a personal interest in discovering what motivates and excites each student
- **Diversity:** We embrace the diversity of our students and strive to provide inclusive educational opportunities to support all students
- **Appreciate People, Land and Culture:** We believe in fostering a spirit of collaboration and respect in our interactions with one another, our students, our community, and our environment.
- **Authentic Learning:** We value relevant learning experiences that can be applied broadly for future success
- **Commitment to quality:** We value continuous improvement in the design of our courses and aim to deliver quality learning experiences, which includes staying current in our disciplines and teaching practice.
- **Collegial and collaborative department:** We value our colleague's knowledge, our culture of excellence, and support each other to maintain and enhance excellence in teaching.

## Appendix III – Program Learning Outcomes for the Engineering Foundation Certificate

The goal of this certificate is to adequately prepare students for second-year studies at an accredited university engineering program in the province of British Columbia. Upon Successful completion of this program, students should be able to:

- Communicate effectively with written and spoken language, and with technical drawings and sketches.
- Apply mathematics, science and technology skills and knowledge gained in program courses to solve real-world problems.
- Apply team work and leadership skills in all groupwork, projects, and work term positions.
- Conduct themselves in a professional and ethical manner in academic and professional environments, consistent with Engineers and Geoscientists of British Columbia (EGBC) code of ethics.
- Explain Engineering and Geoscientists of British Columbia's commitments to reconciliation and decolonization in the engineering profession.
- Describe the roles and responsibilities of engineers in society.
- Apply intercultural and local Indigenous perspectives in meaningful and respectful ways in relation to the program.

F. Completed Action Items

#	Desired Outcome	Completed Actions	Challenges, Successes, and Impacts
	<i>What did you want to achieve?</i>	<i>What actions have been taken to achieve the desired outcome?</i>	<i>What challenges have you encountered, what successes have the change brought, and/or what impacts have the changes had on the student’s learning experience?</i>
1	<b>Develop Vision, Mission, Values statements</b>	Vision, Mission, Values statements were completed April 2024	Completed April 2024, though not finalized as the Dean suggested some changes. Recommendation to return to these items after curriculum mapping is complete.
2	<b>Develop Program Learning Outcomes</b>	Program learning outcomes complete and approved by Education Council	October 2024
3	<b>Develop Tracking Methods for Action Item Progress</b>	Spreadsheets for most ongoing action items (e.g. evidence of student success, student-community engagement, end of course surveys, high impact practices) have been prepared and are available to all math-science faculty on SharePoint to document	Tracking allows all faculty in the department to be aware of each other’s actions and efforts to build the program, which supports a culture of excellence. The Action Plan developed for the Final Report was detailed and included many existing department activities that meet many goals but are not tracked systematically in any way. These include evidence of student learning, ways in which community is brought into the classroom and students into the community, and climate change practices amongst others. Input from the Dean’s office was to limit the number of Action Plan goals, but that would mean losing the visibility of these actions. They have been included in this one-year report, though the format of the one-year report necessitates a new numbering system for these action items.
4	<b>Complete Curriculum Mapping</b>	Curriculum mapping has been completed (Dec. 2024) for all the courses that are within the Math-Science department.	The Curriculum Mapping to PLOs will be revisited as part of annual department-wide meetings at which we examine the One-Year Report Action Plan and set short-term collective department goals. As more course learning outcomes are updated to better align with PLOs, the output of the curriculum mapping is expected to show continual improvement in alignment of PLOs with curriculum.
5	<b>Update Course Learning Outcomes</b>	Courses that have been updated since 2023 include: CHE 152, MAT 181, 182 PHY 120, 121 ENR 100, 101	Course curriculum better aligns with program learning outcomes, implements current research on teaching practice, and provides more diverse assessment practices.

#	Desired Outcome	Completed Actions	Challenges, Successes, and Impacts
6	<b>Maintain Communication between Department and Advising</b>	The department chair connects regularly with educational advisors.	Students are provided with current and detailed information about how NIC programs and courses meet their educational goals and prepare them for the labour market.
7	<b>Increase the linkage between Professional Development activities and department-wide and College-wide goals</b>	In May 2024 the department developed department PD goals for the first time. Faculty were encouraged to include these department PD goals in their personal PD plans and to engage in PD activities to meet those goals. Two specific goals include Indigenization of the curriculum and address use of GenAI tools by us and by our students. Departmental PD goals and plans in combination with the new PD planning forms have helped with this alignment	Faculty will participate in GenAI workshops in May and June 2025 to share existing practice and support everyone in their learning. Course Learning Outcomes will be updated to include Technology (GenAI tools) and Indigenous Perspectives. Challenges with Indigenization are outlined above in Section E on Indigenization. Yearly discussion at dept. meetings to ensure our plans and goals are up to date
8	<b>Explore Work-Integrated Learning Courses and Opportunities</b>	In December 2023, the new course ENR 190 Engineering Work Term was approved by Education Council. In January 2025, a new module on employment preparations was added to ENR 101 and delivered by the Work Integrated Learning department faculty.	Resources to offer and support the course in the future. Resources for WIL faculty and MASC faculty required.
9	<b>The End of Course Survey is implemented in all courses</b>	All Engineering Certificate instructors are currently using the end of course survey	Only requirement is the ongoing support for the survey from CTLI



## G. Plans to Complete Remaining Action Items

This Action Plan will be reviewed annually each Spring to ensure regular monitoring, update action items, and refresh as needed to respond to changes in post-secondary education.

#	Desired Outcome	Actions	Updates	Person(s)	End Date	Resources	Monitoring	Results
	<i>What do you want to achieve?</i>	<i>What actions will be or are already in progress to achieve the desired outcome?</i>	<i>What actions have already begun? What changes or edits have happened? What are your next steps?</i>	<i>Who will be responsible for leading?</i>	<i>Month/year</i>	<i>What resources will be required to complete this action?</i>	<i>How will you track the implementation of your action?</i>	<i>How will you know that you have achieved your desired outcome?</i>
<b>1. Commitment to Learners</b> <i>This area focuses on the program’s commitment to student learning by reflecting on the underlying values and philosophy of the program. This includes the alignment of program commitments with the needs and expectations of students, the institution and the broader discipline, industry, or profession.</i>								
1.1	<b>Develop and implement a Department Indigenization Plan for the program and courses</b>	<ol style="list-style-type: none"><li>1. Have a Department Workshop in June 2025 to discuss how to Indigenize Course Learning Outcomes (e.g. one course at a time or department wide practices?) and begin the work to Indigenize CLOs.</li><li>2. Meet with the Working Together Group to discuss and develop department Indigenization plan.</li><li>3. Develop a Department Indigenization Plan</li><li>4. Develop a tracking method to record Indigenization practice and content in collaboration with the Dean’s office.</li><li>5. Add the new Indigenization and Internationalization Course Learning Outcome</li></ol>	<p>Faculty are encouraged to: Participate in workshops provided by Office of Indigenous Education and Global Engagement on Indigenization of Course Learning Outcomes in the Winter 2025 term</p> <p>June 2025 workshop is scheduled to discuss Indigenization of Course Learning Outcomes and to develop the Department Indigenization Plan in collaboration with the Working Together Group</p>	Sandra Milligan	<p>Dec. 2025 to draft a Department Indigenization Plan.</p> <p>Ongoing to add the new CLO to course curriculum.</p>	<p>CLTI Resources</p> <p>Working Together Working Group consultation</p> <p>Subject specific resources from Articulation Committee</p>	Our Action Plan will be reviewed and updated annually	<p>All Course Learning Outcomes will include Indigenization. As instructors, we will know more about our local First Nations and that aspect of Canadian History, we will know how to facilitate Indigenous and intercultural learning, and we will support sharing of content in our classes that relates to local First Nations (where it is appropriate to share).</p>

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		to courses as practices are developed.						
<b>2. Program Structures</b> <i>This area focuses on the roots and design of the program, as well as how and why the program has evolved over time highlighting key milestones, developments, and accomplishments as it relates to the student learning experience. This includes the evolution itself, as well as the mechanisms in place for identifying and responding to emerging needs and changing realities.</i>								
2.1	Improve alignment of program learning outcomes to curriculum	<ol style="list-style-type: none"><li>1. Continue to update remaining Course Learning Outcomes to better reflect Program Learning Outcomes and diversify assessment formats.</li><li>2. Create document to guide Math-Science instructors on CLO updating, so that certificate PLOs are included appropriately, and consistently with other Math-Science courses.</li><li>3. Create an internal document that provides more information to instructors for the purpose of updating curriculum mapping using the UBC tool so that assessments (e.g. exam, vs midterm, final exam), and other terms (technology) are clearer.</li></ol>	<p>In 2025, courses for which learning outcomes will be revised include: Mat 133 Phys 170, 216</p> <p>In 2026, courses for which learning outcomes will be revised include: MAT 210, and 214 PHY 215</p>	Aisling Brady and Jennifer Fallis-Starhunter	August 2026	CTLI	The Curriculum Mapping to PLOs will be revisited as part of annual department-wide meetings at which we examine the One-Year Report Action Plan and set short-term collective department goals.	The department has evidence that demonstrates how our courses meet our Program Learning Outcomes.

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<b>3. Learning Community</b> <i>This area focuses on the program as a learning community. This includes interactions and relationships between and among faculty and students within the program, as well as engagement with broader communities (e.g., institutional, regional, discipline, industry, or profession-specific relationships).</i>								
3.1	<b>Create a Program Advisory Committee</b>	Once policy has been developed by senior administrators, recruit members for a PAC, develop Terms of Reference and commence regular meetings	We have put this item on hold until more direction is provided from college policy (to be created) and the Dean's office.	Alex Blair	Unknown	Dean's office	The Math-Science Dept has 3 members on Education Council and so will be aware when the policy is presented and approved	Regular PAC meetings with minutes including feedback
3.2	<b>Explore Work-Integrated Learning Courses and Opportunities</b>	1. Add science-focused employers to career fairs. 2. Offer the ENR 190 course for students	We have created the ENR 190 Engineering Work term course, and are waiting for resources and approval to offer to students.	Dennis Lightfoot	Unknown	Dean's office. Work Integrated Learning department	Ongoing discussions with dean and WIL department	Course offered
3.3	<b>Climate Change</b>	1. Continue to track learning activities that address climate change. 2. As a department, operational activities are carried out to reduce waste and enhance sustainability. 3. Climate change responsibilities of engineering profession included in curriculum.	Lab technicians have been revising practices to eliminate single use materials, when possible, to reduce water use (new vacuum pumps). Faculty events are organized to reduce and divert waste. EGBC requirements regarding climate change included in content and projects for ENR 100 and 101.	Lab technicians, Alex Blair, Dennis Lightfoot	Ongoing	Facilities department	Annual report updates	
<b>4. Practices</b>								

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<i>This area focuses on teaching and learning practices, including assessment and evaluation methods and the alignment of these approaches to supportive practices. This includes the methods or approaches members of the department engage in to fulfil the stated commitments while engaging in reflective practice.</i>								
4.1	<b>Outline and create repository of existing departmental High Impact Practices (HIPs)</b>	Document all existing HIPS practices in a tracking tool to be developed with support from the Dean’s office	The spreadsheet has been completed, and math-science faculty are asked to add information related to HIPs, as an ongoing process.	Aisling Brady	Ongoing	CTLI Teach Anywhere website	Create an Excel Spreadsheet on SharePoint with one-pagers for each course.	A repository of what has been completed by our program areas will be evident. Gaps in HIPs can be explored to further enhance our offerings.
4.2	<b>Develop new High Impact Practices</b>	4. In collaboration with the Dean’s office, develop a checklist for instructors that covers the documentation requirements for taking students off campus for field trips. E.g. waivers, driving arrangements, expense submission.  5. Clarify the budget available to support HIPs.	Associate Dean was asked for support in this area in Dec. 2024	Alex Blair	Depends on Dean’s office	Dean’s office	Annual Action Plan updates at April department meetings	We will have a checklist of actions of actions required for faculty who want to take students off campus for HIPS activities, with supporting documents and policy prepared in collaboration with the Dean’s office.
<div>5. Collective Impact</div>								

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<i>This area focuses on the accomplishments and contributions of faculty and students from the program. This includes learning experiences, opportunities and outcomes related to the program. This also includes mechanisms in place to help faculty and students reflect upon and recognize accomplishments.</i>								
5.1	<b>Develop a Research Sharing event</b>	Develop a regular (e.g., annual) research sharing event showcasing student and faculty research to the NIC community and the broader community.	Planning underway for winter/spring 2026.	Sarai Racey	ongoing	Dean’s office support	Event feedback survey.	Enhanced visibility of NIC student and faculty community research.
5.2	<b>Student success recognition</b>	Continue offering a math-science awards tea recognizing students’ academic accomplishments	This event is held every May.	Alex Blair	ongoing, annual event	Printing support, financial resources for catering.	Annual event	Students can see their role in their program and feel appreciated for their work.
5.3	<b>Community contributions</b>	Continue to be the lead in organizing Annual Math Contest for High School Students, and the Community Science Celebration	These events have been occurring for over 10 years, with some gaps during Covid.	Alex Blair, Natalie Ward, Michael Willers	Ongoing annual events	Financial support from Dean’s office for Community Science Celebration and the Math Contest Financial and staff support from Community Engagement Team for Com. Science Celebration	Positive feedback from students and the community at large	Enhanced visibility of NIC programs to improve student and employee recruitment