Program Review

Final Report

Engineering Foundations Certificate

Faculty of Arts, Science, and Management

North Island College

May 2023

Submitted to:
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North Island College

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Preamble

As we continue working through the process of program review and renewal we are guided by the college's overarching, interwoven strategic plans, ***BUILD 2026, Widening Our Doorways,*** and ***Working Together*** – *the NIC Indigenization Plan.* The recommendations put forth (and the action items detailed in the accompanying Action Plan) align with commitments articulated in the guiding documents and are part of our continued effort to meet the needs of our diverse community of learners.

A. Executive Summary

The Engineering Program wrote a self-study and shared it with three reviewers who formed the external review team. The reviewers met virtually with various people at North Island College for two days to explore and learn more about the challenges and successes of the Engineering's Foundations Certificate.

The reviewers provided forty-six recommendations related to commitment to learners, program structures, the learning community, practices, and collective impact. These included recommendations regarding curriculum development, program goals, student engagement, Indigenization, and internationalization.

The Engineering Program has written this final report summarizing their self-study recommendations, along with their response to recommendations from the external review team.

This report accompanies an Action Plan report which details action items to undertake the recommendations.

B. Background

In accordance with North Island College's Policy 3-11, the department undertook the program review process. This final report synthesizes recommendations and next steps from the department's self-study and the external review report.

The self-study was completed in January 2022 and submitted to the dean of Arts, Science, Technology, Business & Applied Studies, Dr. Neil Cruickshank. Survey data from current students, alumni, and faculty were included to support the conclusions and recommendations shared in the self-study.

The external review visit was conducted in February 2022 via online meetings using the web conferencing platform, BlueJeans.

The external review team consisted of Regan Sibbald, Professor, Engineering Certificate and Physical Sciences, Coast Mountain College; Dr. Brian Dick, Chair and Professor, Department of Physics, Engineering, and Astronomy, Vancouver Island University; and Othman Bennis, Business Administration faculty, North Island College.

The external review team, in fulfillment of its responsibilities, met with:

1. Vice-President Academic: Tony Bellavia
2. Dean, Faculty of Arts, Science, Technology, Business & Applied Studies: Dr. Neil Cruickshank
3. Engineering Foundations Certificate - Program Review Lead: Dennis Lightfoot
4. Department of Math and Science - Chair: Alexandra Blair
1. Director, Centre for Teaching & Learning Innovation: Dr. Liesel Knaack
2. Director, Institutional Research & Planning: Wes Skulmoski
3. Student Records Assistant: Diana Fearn
4. Senior Financial Aid Advisor: Brooke McIntosh
5. Executive Director, Office of Global Engagement: Mark Herringer
6. Manager, International Enrolment & Recruitment: Junko Leclair
5. Registrar: Michelle Badger
6. Assistant Registrar: Darin Bellham
7. Executive Director, Office of Indigenous Education: Kelly Shopland
8. Faculty
9. Students and Alumni

This final report is based on the program self-study, the external review report, and responses from program faculty.

C. Program Characteristics

NIC's Engineering Foundations Certificate program is offered in a combination of delivery formats – on-campus at Comox Valley, Campbell River and Port Alberni, and digitally synchronous, and asynchronous. The 34-credit program can be completed in one year of full-time study or over an extended period, taken part-time.

Admission requirements to the program are:

- B in pre-Calculus 12 or equivalent,
- C+ in English 12 or equivalent,
- C+ in Physics 12 or equivalent,
- C+ in Chemistry 12 or equivalent

Credential completion requires an overall average of C+ (GPA of 2.33) calculated on all courses counting toward the Engineering Foundations certificate.

D. Summary of Strengths and Challenges

Strengths

Dedicated faculty is the core factor positively affecting the program's abilities to meet learner commitments. Faculty are determined to ensure students succeed decisively in achieving the learning outcomes, being prepared for second-year university studies in engineering and gaining admission to a second-year university engineering program. Towards these goals, the program highlights specific positive elements:

- Excellent relationship with the University of Victoria
- Renewed Guaranteed Admission Agreement in 2021 supports students' access to further learning
- Dual admission agreement with UVic further enhances students' access to learning and to scholarships at both institutions
- Flexible programming, whereby students can take one, two, or more years to complete their certificate, and they have the option to also do upgrading and/or some second-year courses for transfer
- Multiple delivery modes, including online, Hyflex, and face to face sections for some courses
- A strong network of academic resources provided by the Library & Learning Commons (Math support, writing support, research help, peer tutoring, and student technical services)
- Qualified instructors available on three main campuses for individual help, even for courses that are only offered online (calculus, physics, and chemistry)
- Centralized academic and non-academic supports
- The Early Assist program provides one-stop access to a broad range of supports for students – meeting both personal and academic needs.

Alumni speak very positively of NIC's Engineering Foundations Certificate program – even following graduation from large institutions, such as UVic and UBC, and have come back to speak to our engineering classes. We have had a handful of UVic engineering graduates come to talk to engineering students, and one UBC engineering graduate. We usually have at least one or two emails every year from our recent students who have just transferred to UVic.

General Challenges

Several factors negatively impact the program's ability to meet learner commitments:

- Workload of six courses per term is too much for many students
    - Many students are setup for failure by the extreme workload in their first semester without adequate preparation. A more flexible program, and appropriate advising, is needed to ease student's entry into post-secondary education
- Limited awareness of the program within local high schools and the community
    - Does not maximize program access
- Lack of a guaranteed admission pathway to UBC, University of Northern BC (UNBC) and Simon Fraser University (SFU)
    - Creates a barrier for some students

- Inconsistent offerings of second-year math and physics courses
    - Impedes development of a two-year diploma program and limits the number of transferrable courses that are available for students who stretch their certificate over multiple years and makes the program unattractive for international students who need a two-year program

- The ability to promote the program from within the program (at the faculty level) is met with numerous roadblocks (getting priority, funding and/or approvals within other divisions of the college)

Challenges that Fall Beyond the Scope of Program Review

There have been virtually no international students in the program in the past few years due to study visas requiring a two-year program of study and the additional challenges due to COVID-19.

E. Self-Study Recommendations

Commitment to Learners

Focus: 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.

Recommendation S8

Promote an online/distance version of the certificate courses:

- Providing access to remote learners and those outside our region
- Goal – to create a mostly distance version of the program

Recommendation S9

Develop different entry points to the program. Including upgrading for those needing preparatory math, science, or English courses

Recommendation S10

Develop different exit points from the program

- Complete first year
- Complete first year plus part of second (possibly as 2-year diploma, as described in APPENDIX C)
- Transfer to second year of Integrated Engineering Technologist program at VIU
- Consistent offering of second-year math and physics courses required for viable second-year program

Program Structures

Focus: 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.

Recommendation S3

Indigenize the content and delivery of the program as much as possible

- Incorporate input from Elders in the local community

Recommendation S7

Create a two-year diploma credential to attract international students and provide a viable two-year study plan for students wishing to take less than six courses per term (See APPENDIX C of the Engineering Program Self Study

Learning Community

Focus: 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).

Recommendation S1

Create a program advisory group

- Including representatives from industry, receiving institutions (UVic), former students, similar college programs, Indigenous communities

Recommendation S2

Create an informal weekly gathering of students and faculty

- At lunch time or the end of the day – when no program classes are running
- Possibly incorporate guest speakers, seminars, or student-project show-and-tells
- Enhance the sense of community in the program

Recommendation S4

Promote increased Indigenous participation in the program

- In NIC's region and beyond

Recommendation S5

Work with school districts to raise interest in engineering among female students

Recommendation S6

Collaborate with International Education (Office of Global Engagement) at NIC to improve program accessibility to international students

Recommendation S12

Increase engagement with other post-secondary institutions on Vancouver Island

- VIU, Camosun, UVic
- Promote engineering programs, pathways, and careers on the island.

Practices

Focus: 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.

Recommendation S11

Develop an optional co-op designation. Including course to transfer to UVic and/or TRU

Collective Impact

Focus: 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.

No recommendations from self-study addressed this point.

F. Summary of Key Findings from the External Reviewers

In general, the External Review Committee found the EFC to be well received by both students and alumni.

Key strengths included its cohort delivery model with small class sizes, and engagement of students by its faculty and staff. Student success upon transfer, as indicated by alumni feedback, a focus on open-source textbooks and resources, and an open-minded approach to diverse instructional modes were also highlighted as positive features.

Key areas for improvement center around creating community and identity within the engineering cohort and its instructors, projecting a consistent story distinguishing the EFC from the DAP, and deepening resilience within the curriculum to enable a more seamless student progression. Primary suggestions include allocating **dedicated project space**, adjacent locating of program instructors to this project space, providing **flexible learning pathways** for students (e.g. enabling blended learning options, re-imagining course scheduling), improving **data collection** supporting student success, and developing a **two-year diploma** curriculum (including an optional **co-op experience**) to provide for a graduated approach to the intensive first-year requirements of the CFYEC support.

Other recommendations include enhancing engagement with industry, professional associations (i.e. EGBC), and Alumni. The self-study recommendation to develop a **program advisory committee** is strongly supported as one channel to respond to this recommendation, as well as to help maintain program relevance over time.

The Committee recognizes that to implement these recommendations it will take considerable time and effort; it is strongly recommended that specific **course release** be provided to the Program lead to enable this work.

G. Program Response to External Reviewers' Recommendations

Commitment to Learners

Focus: 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.

Recommendation E3 and E4

Include a specific class session (likely in ENR 100) early in the term dedicated to providing students a full description of the pathways available (e.g. EFC/DAP) and study options through each. Session may also be used as a welcome event.

The introduction of Thrive Week at NIC is applauded; however, it is unclear how students are made aware of the Early Assist program. This program may be included within the program information session described in Recommendation E3

This recommendation aligns with: WOD POINT #2 Enhancing Student Learning Experiences, Build 2026 - 3.1 Student Well-Being, 3.2 First-year student retention, 4.2 Number of students participating in pathway agreements

Response:

- Should be easy and quick to implement – good short term goal (though determining the pathways themselves might be a longer term one)

Recommendation E15

Mature students are recognized as valuable within the class environment; however, the Committee heard that the scheduling of courses supporting their upgrading to the first-year curriculum is challenging. Although running upgrading courses in parallel with the Fall courses is not recommended, streamlining the academic pathway for these students is.

This recommendation aligns with: Widening our Doorways 2026 – 3.1.d, and Build 2026 – 4.1 Program Entry

Response:

- Work on alternate pathways that include upgrading options is already identified as a goal in the Self Study (S9)

Recommendation E20

Expand dual admission (dual credit) options for students entering the EFC from high school.

This recommendation aligns with: Widening our Doorways 2026 – 3.5 and 3.6.a, and Build 2026 – 4.3 Pathways to Learning, 9.1 Serving the People of the Region

Response:

- This also fits in with the self-study goal of identifying alternate entry pathways for students (S9)

Recommendation E21

Consider adding a module to the EGN design courses on such topics as inclusion and/or working effectively within diverse teams; offer workshops on developing intercultural skills and competencies.

This recommendation aligns with: Widening our Doorways 2026 – 6.1.a bullet point 3, and would help address 8.2, and Build 2026 – 7.2 Diversity, Equity, and Inclusion

Response:

- Reasonable short term goal. Lots of resources already exist for this at the college.

Recommendation E22

Encourage students to participate in international field school and study abroad programs; possibly in cooperation with other post-secondary institutions (e.g., VIU engineering field school).

This recommendation aligns with: Build 2026 – 5.4, Global Learning, 7.2 Diversity, Equity, and Inclusion

Response:

- This would require someone to actively research existing opportunities as I don't think we have the time, resources, or funding to develop our own. I expect that any opportunities we hear about are already shared with students. This would require a program coordinator position or perhaps someone who already works on study-abroad programs at the college to add it to their portfolio.

Recommendation E24 and E25

Ensure program learning outcomes (PLO) align with the graduate attributes (GA) identified by the Canadian Engineering Accreditation Board (CEAB). For example, it is unclear why the program self-study does not identify topical areas such as engineering design and engineering tools, as deliverables within knowledge, skills, and values, nor include professionalism and ethics as distinct outcomes. The alignment of the PLOs with the CEAB GAs will facilitate accreditation processes at NIC's transfer partners, and are included within the CFYEC. Publicly available course outlines for BCIT may provide a useful reference for this work.

Ensure program learning outcomes capture the NIC expected experience e.g. global citizenship, etc…

This recommendation aligns with: Widening our Doorways 2.1 - "Pedagogically sound curriculum design in all programs and areas of instruction"

Response:

- This seems an important recommendation but is likely a medium term goal due to the timeline of getting the work done and approved through curriculum committee and education council – starting the process should be a short-term goal.

Recommendation E30

Engage indigenous students early in junior high school who have an interest in math and science subjects.

This recommendation aligns with: Widening our Doorways 2026 – 3.5, Build 2026 – 4.3 Pathways to Learning, 5.1 Indigenous Education, 9.1 Serving the People of the Region

Response:

This was identified (though less specifically) in self-study recommendation S4. The mechanisms by which to identify these students could also be part of the work of self-study recommendation S5

Program Structures

Focus: 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.

Recommendation E1

Re-visit the program vision statement to better capture where the program sees itself in the future. It ought to be aspirational, succinct, and provide a clear focus. For example, a statement such as "We will enable access to, and success within, engineering education for all learners regardless of their individual pathway" will promote much of the content of the statement as currently written (e.g., flexibility, in-community learning, access) while encouraging further initiatives.

This recommendation aligns with: Build 2026 - 4.1, 4.2, and 4.3 and Widening our Doorways 2026 - 4.3.

Response:

Agree that a more inclusive and aspirational vision statement would be useful in directing further initiatives. This should be part of a renewal plan that includes curriculum development work discussed above – medium term plan, but needs to be started now.

Recommendation E2

Disentangle the EFC from the dual admission program, and emphasize and clarify the pathway option each represents: The EFC, being aligned with the Common First-Year Engineering Curriculum (CFYEC), provides a pathway to any post-secondary institution in BC (and possibly the University of Alberta) for students to continue their engineering studies; the DAP, mirroring the UVic pathway directly, is best for students planning to transfer to UVic, and can be easily leveraged to develop a two-year credential to build resilience within the student academic journey towards an engineering degree.

This recommendation aligns with: Build 2026 4.3 and Widening our doorways 3.6b

Response:

The engineering program members agree with this recommendation. This needs to be done in cooperation with advising, recruitment and the program coordinator to make sure the right information gets published.

Recommendation E5 and E6

Develop a shareable poster and/or other visual tool showing all pathway options and their interconnections to demonstrate a common message within areas at NIC (advising, recruiting etc.), and for its prospective and current students.

Fully engage the program and dean's office within the marketing / recruiting process; create a consistent and cohesive message to better support the student choice (e.g., pathway options).

This recommendation aligns with: Widening our Doorways 2026 - 3.6b

Response:

I think this would be a valuable document and should be developed in the short term with the existing pathways, and then revisited once more work has been done on researching alternative entry and exit points and upgrading (I don't think we should wait to complete the pathway work to make a first draft of this document)

Recommendation E7

Provide a consistent level of advising support and expectations for the EFP as is the case for the DAP. For example, it was mentioned that students are expected to meet with an advisor for the DAP, but such an expectation does not exist for the EFP. It is unclear why these otherwise similar programs have this differing level of student engagement.

This recommendation aligns with: Build 2026 – 3.2

Response:

- Agreed – should be consistent with DAP and EFP. A program coordinator could be an effective advisor of all pathway options and course selections for each pathway. This should be a short-term action

Recommendation E8

Include a welcome letter from the program head to accepted students (including conditionally accepted) by mail to provide a program focused story and build excitement to attend; follow-up by phone.

This recommendation aligns with: Build 2026 – 6.2

Response:

Agreed, this is getting done as a test run this year by the dean and in the future would be another role, that could be done by the program coordinator.

Recommendation E11

Provide dedicated release with the program to provide time to better coordinate and activate recruiting/retention/community partnership initiatives.

This recommendation aligns with: Build 2026 – 1.2, 3.2, 5.5, 6.2, and 9.2

Response:

- Release for someone to take on the leadership role in implementing the recommendations outlined in this program review should be a priority. While much of the role of a program coordinator has been done off the side of desk for years, this is not sustainable and the number of items in the action plan will require some more resources for at least the next few years as we revise and grow the program for the future. This should be a short-term action item.

Recommendation E12-14

Soften the Physics 12 and Chemistry 12 requirements to be consistent with that of UBC (e.g., "Students lacking Physics 12 but with a strong grade in Physics 11 may be considered and are encouraged to apply" and "Students lacking Chemistry 12 but with a strong grade in Chemistry 11 may be considered and are encouraged to apply"). With these changes, the admissions officer should defer to the evaluation of the student to the program chair who is expected to consult with the relevant instructors (chemistry and physics) with an understanding of the broader grades presented by the student. It would not be recommended that a student that does not present both Chemistry 12 and Physics 12 be admitted regardless of their other grades. At all times, a focus on the likelihood of student success in the program ought to be prioritized.

Soften the Pre-Calculus 12 requirement to a "C+" to match with the prerequisite for MAT 181.

Explore option to soften English 12 requirement with consideration for the minimum English profession requirement required by NIC's transfer partners. UBC may require a second, first-year level English course if the English 12 grade is too low; UVic appears to only require a single first-year English course, which is met by the Engineering Foundations program. It is noted that communication is a considerable requirement within the first-year program itself; reducing the English requirement may impact student success.

This recommendation aligns with: Widening our Doorways 2026 – 3.1.b

Response:

- These recommendations are consistent with self-study recommendation S9, and also provide additional flexibility for students to take less upgrading before starting the program courses. Agree that these will reduce barriers for students. This should be a short to medium term action item – it will require education council approval, but because it is a lowering of entrance requirements it can take effect immediately on approval.

Recommendation E16 and E33

Develop a two-year diploma option to UVic leveraged from the current DAP; such a diploma may appeal to International students, provide opportunity to interweave courses to support student success, and allow expansion into some second year courses that may be of value for students upon transfer. Note that EFC students would also have the option to transfer into this diploma if circumstances require.

Enhance learning opportunities by expanding the Dual Admission program to include an Engineering Foundations Diploma with the following considerations:

Reduction to 4 or 5 courses per term, and spread first-year program over two years (e.g., Fall - CPS 102, ENR 100, ENG 115, MAT 181, PHY 120; Spring - ENR 101, ENG 160, PHY 182, PHY 121; Fall - MAT 133; Spring - CHE 152, PHY 141).

Suggest adding CALC III in Fall (2nd year) and CALC IV in Spring (2nd year) as these are strongly suggested by transfer partners to be taking prior to transfer to better ensure student success.

Add CS/SCI credits as needed (discipline specific).

Diploma can align with CFYEC through proper advising to students. By providing an easy option for them to add one course in the Fall (i.e. MAT 133), they likely can make a decision early to continue with the CFYEC requirements in the Spring, or drop back to the baseline diploma option for progressing. It is advised not to move away from the CFYEC yet, as the Committee believes the diploma can be structured in such a way as to provide this pathway to students while maintaining options for those students who require additional time to complete their studies.

Partnership with other PSIs regarding offering 2nd year Engineering and Physics courses. For example, would UVic be open to provide a lecture experience for classes virtually, while NIC facilitates the in-person labs? Would VIU and NIC be able to cooperate on offering such courses as Linear Circuits and/or E&M under similar conditions?

This recommendation aligns with: Build 2026 - 5.5 and Widening our Doorways 2026 – 3.6c

Response:

- This is addressed in self-study recommendation S7. This should be a medium-term goal.

Recommendation E17

Develop dual admission or dedicated pathway option for students to transfer to VIU's Integrated Technologist Diploma program.

This recommendation aligns with: Widening our Doorways 2026 – 3.6c

Response:

- Adding this pathway was recommended in self-study recommendation S10, and we could certainly add a dual-admission pathway if VIU is willing. Transfer pathway to VIU should be a short to medium term action, but dual admission would likely be longer term to coordinate.

Recommendation E18 and E19

Continue to work with UBC for inclusion on their Engineering Transfer program list; note that this initiative is in parallel to efforts being made through the CFYEC.

Develop a transfer pathway option to the University of Alberta, consistent with other institutions who have aligned with the CFYEC.

This recommendation aligns with: Widening our Doorways 3.6c

Response:

- NIC continues to work as part of the CFYEC initiative to provide options for our students, and will continue to work with UBC in particular to get guaranteed admission for our students. This will be an ongoing action item for medium and long-term.

Recommendation E40

During the External Review, NIC received an announcement related to adding student housing on campus. The Committee recommends that this project may provide an excellent opportunity to expose faculty and students to a local and relevant engineering design challenge.

This recommendation aligns with: Build 2026 - 9.1, 9.2, and 9.3 and Widening our Doorways 2026 - 4.1

- **Response**: Agreed – the instructor is always looking for authentic client-based projects for students to work on during the ENR 100 course in the fall. The opportunity to see a project being built and study the process from needs assessment, sustainable design, etc. can also be included in this course. Great idea! Will be short to medium term action item, as the building project proceeds.

Learning Community

Focus: 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).

Recommendation E10

Engage with local industry to enable an optional co-op opportunity after the first year of studies; work with UVic to ensure co-op credit upon transfer. Note that a co-op preparation course focused on writing cover letters, interviewing skills etc… offered by NIC can be perceived as valuable towards general life skills even if students are not successful with obtaining a co-op. UVic may require that students take their co-op preparation course upon arrival; this should not be considered a barrier to this initiative, although should be communicated clearly to students to avoid misunderstanding.

This recommendation aligns with:

- WOD POINT #8. Socially Just Learning
- Build 2026 4.3, 5.2, 9.2, 9.3

Response:

- Related to self-study recommendation S11
- Making it possible for the students to do a co-op would be great, but how do we add the co-op prep course to an already overloaded course schedule? This may be most feasible for students who are staying at NIC for two-years, in which case they may want to do two summers of co-op before transferring to UVic (UVic has said that they would consider transfer of up to two co-op terms).
- The dean also supports pursuing a coop or work placement opportunity (dean's recommendation 2).
- Should be a medium-term action, similar to others that will also need curriculum committee and education council approval. Start work now to implement in two years time.

Recommendation E27

Directly engage (with indigenous communities) in-community through the student design projects (as protocol allows). Engineering projects emphasis stakeholder engagement, context …etc. and would align to this work.

This recommendation aligns with:

- WOD POINT #5. Indigenous Led Learning and Reconciliation
- Build 2026 5.1

Response:

- A good idea to pursue as part of self-study recommendation S3 and S4

Recommendation E29

Include members from local Indigenous communities in the proposed program advisory group.

This recommendation aligns with:

- WOD POINT #5. Indigenous Led Learning and Reconciliation
- Working Together Guide 2, 4, 10
- Build 2026 5.1

Response:

- This is already part of self-study recommendation S1 and S3

Recommendation E34

Create a dedicated space for students with the goal to create community and opportunity for students to identify as 'engineering students.' These spaces are common at many institutions offering engineering programs, including transfer programs. The room could serve many purposes:

- Engineering Design Studio / Laboratory
- Continuing and dedicated access to a MakerSpace
- Engineering student study / gathering space
- Weekly gathering space
- Student learning support area, particularly impactful if instructor offices are proximate.
- (Differentiate from other institutions - peer support, build community, NIC advantage, enhance learning)

Note that cohort development / peer supported learning have a known positive impact on student success; enabling conditions for those relationships to form are essential. Additionally, for transfer schools, students ultimately leave after one or two years, and these students have a disadvantage upon arrival at the receiving school, in that they lack a year of relationship building. If these students arrive with pre-existing friendships formed within the NIC cohort (supported by such facilities as a dedicated learning space), they are more likely to have a successful transition.

This recommendation aligns with

- WOD 2026 – 1.1.b

Build 2026 2.4, 3.2

Response:

- Definitely a good point. We need the College's support on this. Hope with the student housing project, this may become more feasible.
- There was also a comment related to this in the dean's report. I think that while there is certainly an opportunity to provide a meeting space in the proposed flex-room as he suggests, I think that the emphasis on a maker-space/ project work space is important and that may not fit with the flex-room option.

- Maker-space should also be adjacent to faculty offices for supervision and consultation purposes. Does not need to be excessively large, but should have access to 3D printers and some basic hand and power-tools (which could be donated)
- This should be a medium term action item.

Recommendation E35

Collect more feedback data from students, parents, receiving institutions, etc. to support decision making and evaluate the efficacy of initiatives undertaken. The Committee recommends reaching out to alumni through email and phone, and seeking permission from students to contact them prior to their moving on from NIC. A contact list should be maintained for the purpose of program reflection and improvement.

This recommendation aligns with

- WOD Point #4 Program Response & Renewal
- Build 2026 5.5, 7.3

Response:

- This is important for keeping the program current and be responsive to needs of our students and other stakeholders. This can be done in collaboration with CTLI.

Recommendation E41

Enhance relationship with the local branch of EGBC to facilitate access of students to their local seminar / dinner events, which typically take place monthly. Such events enable networking opportunities to students, engage local industry with the program at NIC, and may support a potential co-op option.

This recommendation aligns with

- WOD Point #2. Enhancing Student Learning Experiences
- Build 2026 3.2, 5.2

Response:

- The Engineering Program Members agree with this recommendation. Elements of this recommendation have already been identified within the self study as well. This would fit perfect into the role of the program coordinator.

Recommendation E42 and E44

Support/host a local popsicle stick challenge during Engineering Month; possibly partnering with the local EGBC branch.

Engage students early through engineering/physics/math events and competitions. An engineering competition open to institutions on Vancouver Island is one suggestion.

This recommendation aligns with

- WOD – Communities; #2 – Enhancing Student Learning Experiences
- Build 2026 4.3, 6.1, 9.1, 9.2, 9.3

Response:

- The Engineering Program Members agree with this recommendation. This would fit perfect into the role of the program coordinator.

Recommendation E43

There is great benefit to strengthening engagement with the NIC EFC alumni network. For example, the opportunity for this network to contribute towards continuous improvement of the program was mentioned in Recommendation #35. Further benefits may include a potential pool to create student scholarships/awards/bursaries, co-op opportunities, classroom speakers, and student engagement.

To this end, the following are recommended:

a. Maintain connection with Alumni through a LinkedIn page and encourage students and alumni to sign-up. Such a page may also assist with drawing from the Alumni network for engaging with engineering design projects and potential work integrated learning opportunities.
b. Alumni speaking seminars for current students which focus on their education and career pathway after completing the program.
c. Create a NIC - Engineering newsletter to keep in touch with alumni, including their stories of those of current students, and initiatives underway.
d. Create a mentorship program between Alumni and current students to support student success and engagement. This may be particularly relevant for improving gender balance and Indigenous student participation, and other marginalized groups.

This recommendation aligns with

- WOD Point#2 Enhancing Student Learning Experience.

Response:

- This is a very good point. We can work with NIC Foundation on this as well. The newsletter might be produced in collaboration with NIC Communication office.
- There is a NIC Engineering alumni LinkedIn group which was well subscribed in past years (that was our contact point for many of the alumni who participated in the external review). It has not been as well subscribed in the past few years, but could be promoted more in the engineering courses and especially for students who are graduating.

Recommendation E45

Indigenous Engagement - There is real opportunity to expand engagement with local First Nation communities:

- Provide opportunity to work on ENR 100/101 projects within the First Nation community being a primary stakeholder and/or in-community as protocol allows.
- Engage with NIC Indigenous Education Council.
- Work with Indigenous Education Navigators early.
- Get out into the community as protocol allows; work with Office of Indigenous Education to enable.
- Work with UBC to evaluate whether an equivalent to their Indigenous Transfer program to Langara can be adapted for NIC (work is currently underway to see if this pathway could apply to the CFYEC generally).

This recommendation aligns with

- WOD #5 Indigenous Led Learning and Reconciliation
- Build 2026 4.3, 5.1
- Working Together – Guiding Principles #2, #3, #4

Response:

- The Engineering Program members agree with this recommendation, and also identified this in the self-study. As highlighted in the self study, the department has done an indigenization PD activity already and can built onto that knowledge. It is recognized that further discussion is also needed with Elders in Residence, and Indigenous Education Council, along with the Executive Director of Indigenous Education and the Indigenous Education Facilitator. Any action items coming out of this recommendation will be based on college-wide (*BUILD 2026, Widening Our Doorways, Working Together*) indigenization policies/plans.
- The Engineering Program will take greater part in this institutional-wide initiative and will work with Elders to identify the need for modifications to the program to further welcome students from our First Nations communities.

Recommendation E46

Host STEM related summer camps or learning fairs.

This recommendation aligns with

- WOD - Communities
- Build 2026 6.1, 9.1, 9.2, 9.3

Response:

The engineering program review members agree with this recommendation, and identified raising interest within female students in the self study. In fact NIC is already offering STEM and engineering summer camps, so no action needed here.

Practices

Focus: 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.

Recommendation E23

Collaborate with international post-secondary institutions and promote international exchange teaching assignments within the faculty.

This recommendation aligns with:

- Build 2026 1.2

Response:

- International collaboration could be a way to build international enrolment in our program. Other initiatives are more pressing, however.

Recommendation E26 and E39

Provide periodic opportunity for program faculty to examine and refresh program learning outcomes, and ensure alignment exists between assessments (formative and summative), course learning objectives, class activities and program learning outcomes

Encourage developing an instructional group from all instructors within the program to coordinate curriculum content, discuss student expectations, scheduling of major assessments (e.g., exams, major projects, major assignments), and share best practice. Suggest that such a group meet formally, at least, prior to the Sept-Dec term for planning, between the Sept-Dec and Jan-Apr term for planning/reflection, and at the end of the Jan-Apr term to reflect.

This recommendation aligns with:

- Widening our Doorways 2.1b

Response:

- There is a need for a more formal commitment to course refresh/revision at NIC. Keeping each other in the loop regarding major projects and revisions to courses is a good idea and would seem to be easy to implement.

Recommendation E28

Include coursework and/or workshops on Indigenous protocol, acknowledgement …etc. Such content would be of value for engineers in the field; EGBC may have supporting resources.

This recommendation aligns with:

- Widening our Doorways 5.1a
- Working Together: Understanding and Reciprocity Goals 2 and 3

Response:

- This is an opportunity to involve Elders from the local community in a workshop setting.

Recommendation E31

Provide enhanced digital learning options to facilitate Indigenous students to remain closer to their communities, and enable their giving back to those communities through sharing success stories.

This recommendation aligns with:

- Widening our Doorways 5.1a
- Working Together: Relationship Building and Self-determination Goal 3
- Build 2026 4.2 WoD Academic Plan, and 5.2 – Place-based Learning Strategy

Response:

- This has been identified in the self-study as well (Recommendation S8)
- Also supported by the dean's recommendation 4

Recommendation E32

Suggest modifications to the EFC as follows:

- Both MAT 181 & 182 are listed at 5.0 contact hours each, for 3 credits. This is not consistent with other post-secondary institutions in the system nor the CFYEC, which typically prescribe four contact hours for similar credit. This extra hour is of value, but we wonder if it might be repurposed more generally to the program.
- CPS 102 does not appear to have a lab hour attached - the 3 hrs / week assigned is low compared to what is typical at other institutions in the province (and less than that specified for the CFYEC).
- Alignment of PHY 141 and PHY 170 to CFYEC requirements for combined transferability to UBC/UVic.
- Improved alignment of ENR 100/101 to the CFYEC.
- Explicit alignment of ENG 115 / ENR 100 and ENG 160 / ENR 101 would add value to both courses - it is not clear if this is taking place at the moment. This alignment would be consistent with the UVic offering of its two courses ENGR 110 and ENGR 120.
- Students achieving less than a 'C' in MAT 181 are considerably impacted in their progression. Suggest to have a section of MAT 181 offered in the Spring, providing flexibility for students to continue with their academic goals in a timely manner. Additionally, MAT 182 could have an intersession offering to provide the ability of students to complete their first-year calculus requirements prior to entering their second year of studies.

This recommendation aligns with:

- Widening our Doorways 3.3 and 3.6

Response:

- CPS102 does have a 1-hr. Lab per week as specified in the course ACD. Somehow it showed 3-hr block in the fall 2021 DLS schedule, though we did run the course in 3+1 format. It is scheduled as a 4-hr block for fall 2022, which will be delivered as 3 hours of lecture and 1 hour lab.
- The existing two-hour lab in MAT 181/182 is a key component in the course. That time is spent developing individual and group problem-solving skills, performing assessments, and developing professional skills using computer-based mathematical tools and mathematical word-processing/typesetting. The lab time is also occasionally used to present course content in the context of a shortened instructional term.
- Having MAT 181 offered in the winter term makes sense provided struggling students are identified early (see recommendations E37 and E38) in the Fall and can be directed to the appropriate upgrading course, **and** MAT 182 is offered as a May-August intersession course. Students that struggle in the fall term and take MAT 181 in the winter are not likely to be successful in a compressed 7-week MAT 182 course in May-June.

- ENR 100 and 101 currently transfer to UVic ENGR 112 and 121, which is their version of the design course decoupled from English language courses. These courses do not transfer to UBC, however, so would need to be revised to more explicitly match the learning outcomes, hours, and credits of the CFYEC to get wider transferability.

Recommendation E36, E37 and E38

Enhance access to tutoring for the program courses (perhaps with online access).

Expand formative assessment tools to better address gaps in student learning during the term.

Perform a mathematics skills analysis for each student at the start of the program to identify gaps in knowledge and create a learning plan to address those.

This recommendation aligns with:

- Build 2026 3.1, and 3.2 – first year student retention (E37, 38)
- Build 2026 4.2 – digital service strategy (E36)

Response:

- MAT 181 and 182 currently has employed learning cycles throughout the term. Students are provided multiple opportunities to meet learning targets with no penalty for earlier failures. Students receive feedback on each attempt and are provided with clear statements of expectations. (E37).
- MAT 181 has a “bootcamp” assignment that must be completed in the first two weeks of term. This assignment reveals gaps in preparation that can then be addressed through student

supports such as the Academic Math Support service, or recommendations to upgrade if the gaps are significant. (E38)

- A “pre-course math self-assessment” has already been provided for PHY 120 students prior to (and during) the start of the term along with links to the Academic Math Support service and other resources if there are gaps in their knowledge.
- Given that many students take MAT 181 and PHY 120 without being part of the Engineering Certificate, attaching these resources to their associated courses is more valuable than only proving a program based skills analysis.

Collective Impact

Focus: 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.

Recommendation E9

Communicate success stories from students graduating from the program to within the local catchment area. Focus on those students from marginalized groups (e.g. female students, mature students, indigenous students, international students, …etc.)

This recommendation aligns with: Build 2026 – 6.1, 6.2, 9.1 and 9.2

Response: Great idea - needs to be approved by marketing, but should be easy to implement.

H. Summary

The impact of this self-study on faculty has been extensive. For many years faculty have been working hard to improve courses, student experiences, and the quality of the credentials that we offer, albeit in isolation for the most part.

As a result of the self-study process, the faculty of the Engineering Foundations Certificate have begun to think as a collective; determined to rethink, revalue, and recreate our credentials.

The 46 recommendations from the external reviewers not only support those presented in the self-study but challenged the faculty to celebrate not only the success of our students but the faculty and the work they do to enrich the lives of those students.

The accompanying Action Plan document outlines the actions and next steps the faculty of the Engineering Foundations Certificate will take.