

Name of Academic Unit:

School of Engineering

Civil Engineering
Environmental Engineering
Environmental Engineering Joint Program UNBC/UBC
Master of Engineering in Integrated Wood Design
Master of Applied Science in Engineering
PhD in Engineering (proposal)

Reviewers are asked to provide a report that:

- Identifies and commends the degree program's notably strong and creative attributes
- Describes the degree program's respective strengths, areas for improvement, and opportunities for enhancement
- Recommends specific steps to be taken to improve the degree program, distinguishing between those the program can itself take and those that require external action
- Recognizes the institution's autonomy to determine priorities for funding, space, and faculty allocation; and
- Respects the confidentiality required for all aspects of the review process

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CHAIR/DIRECTOR: Dr. Mauricio Dziedzic	3
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PART 1 - EXECUTIVE SUMMARY

The Executive Summary will be made publicly available on the Provost's website.

ACADEMIC ADMINISTRATIVE UNIT: SCHOOL OF ENGINEERING

DEGREE PROGRAM(S) UNDER REVIEW:

Civil Engineering
Environmental Engineering
Environmental Engineering Joint Program UNBC/UBC
Master of Engineering in Integrated Wood Design
Master of Applied Science in Engineering
PhD in Engineering (proposal)

CHAIR/DIRECTOR: Dr. Mauricio Dziedzic

DATE OF DEGREE PROGRAM(S) REVIEW: April 3-4, 2024

DATE OF THE PREVIOUS DEGREE PROGRAM(S) REVIEW

INTERNAL RESOURCE PERSON: Meagan Jago, Administrative Coordinator, FSE

REVIEW COMMITTEE INTERNAL MEMBER: Dr. Dan Ryan, Chair of Mathematics and Statistics

REVIEWERS

Dr. Gopal Achari
Professor & Head
Department of Civil Engg
University of Calgary
Calgary Alberta

Dr. Bryan Karney
Professor
Department of Civil Engg
University of Toronto
Toronto, Ontario

David Moses
President
Moses Structural Engineers
Toronto, Ontario

I. SUMMARY OF THE EXTERNAL REVIEW OF DEGREE PROGRAM(S) PROCESS

[UNBC edit, VPACAD: The reviewers noted no issues of concern, and that the general approach to the review process met expectations.]

II. SUMMARY OF FINDINGS

Major Strengths of the Degree Program

The major strengths of the programs we identified are as follows:

1. The class sizes are quite small and there is great value in the strong cohort-based program. The small class sizes (usually less than 30 or even smaller) allow the cohort to become friends and work closely together on projects. This contrasts sharply with many other engineering schools who often have classes of 100 or more. The advantage is the notable and significant level of peer-to-peer interaction, support and informal tutoring between students.
2. The small class size and the location of Prince George provide ample opportunities for employment for graduates and students. The vast majority of students in their second and third year have already found employment in the local industry and, impressively, many have permanent jobs lined up long before graduation. Impressively, the number of engineering positions in the neighbourhood exceeds the number of students graduating from UNBC.
3. All the instructors we met were clearly capable, dedicated to their students and the program and engaged as teachers. The students clearly appreciate the enthusiasm, skill and support of the instructors.
4. The instructors and the faculty care deeply about the students and their success. It was obvious that instructors really do care about the students and their welfare and do not easily give up on any student who might be struggling.
5. Staff, and the various student support units (ASC, ARC, Math Success Program, 1st year instructors) were clearly committed to their roles, to the students in the program, and to student success.
6. The teaching assistants (TA's) were widely and generally viewed as both competent and dedicated.
7. The programs have a strong "design spine", with design components in most courses. This was impressive to the external reviewers and was strongly appreciated by the students.
8. The programs have field trips as well as industry collaboration. Both of these lead to better and holistic education.
9. The quality, design and commitment to laboratory facilities was evident and high.
10. Early career researchers are well supported, through start-up grants, reduced teaching loads and lab facilities.

Significant Areas of Weakness or In Need of Further Development

The major weaknesses we identified are as follows:

1. There is a perceived lack of transparency and follow-through on course evaluation and feedback. Though evaluation does take place, there is notable concern (e.g., of retribution) and frustration among the students. Overall, there seems to be a lack of a systematic, purposeful, carefully-

designed feedback process, a lack that suggests that the evaluation of teaching excellence is either mistrusted or unattainable. Moreover, there is a strong sense among the students that any resulting course improvements either don't occur or are not fully communicated back to the students.

2. There are two environmental engineering programs (one jointly with UBC) at UNBC. Within the province, UBC also has a new stand-alone Environmental Engineering program. It may be worthwhile considering one of two options: (i) to reconsider if the stand-alone environmental engineering program at UNBC is an effective use of resources or (ii) to create a more distinct and consciously separate program from the UBC program, by leveraging the easier direct access to applications and field sites. Our sense is that perhaps a greater focus on programs capitalizing on UNBC's unique geographic region and current market demand in forestry and mining (such as mechanical engineering) might lead to higher student demand for admission. It was recommended that specializations suitable to Canada's North – something that would differentiate UNBC from every other engineering school in the south will give it a unique place in Canada's engineering schools.
3. It seems it would be worthwhile engaging the mayor's office of Prince George to promote the community to all of BC and make others more aware of its unique offerings. Links with the local community is fundamental to the future of UNBC.
4. While co-op is a necessary program available to all students, it is not mandatory. The local industry appears strongly supportive of an 8-month co-op. Thus, making such a program mandatory will further assist UNBC to create closer ties with community and highlight the employability of engineering students. However, we note that for a mandatory co-op program to be successful this must be a SoE-led co-op. Currently many programs at UNBC depend on a central co-op office, which has been sporadically staffed, with significant change over, and does not have the capacity to support a mandatory co-op program for the SoE. If UNBC adopts this recommendation, we feel it is mandatory that the new co-op be run through the SoE program. Only in this way can long-term connections be forged with industry, students and faculty. We feel such a program would assist both with student recruitment and retention.
5. There were frustrations around class scheduling. It was suggested that a more SoE-student-centric schedule approach be developed. The frustration articulated included having classes early and late in the day with little schedule in between, or with other larger gaps in the program. There are times in the day which lend themselves to greater attention and better learning outcomes, and these times should be more explicitly exploited when scheduling.
6. There is no guaranteed minimum funding for research-based graduate students. Establishing a guaranteed minimum funding will help attract more and better graduate students.
7. A general M.Eng. which trains people for local and surrounding industry (in addition to the wood program currently offered) will enhance the appeal of SoE, especially programs such as forest engineering, robotics, mechatronics etc. However, a market demand analysis should be conducted prior to making decisions.
8. While the SoE has Wood Engineering as a course-based master's program, it is not at the undergraduate level. Hence there is no direct pipeline of students going from bachelor's to master's degrees.

9. Insufficient space for teaching, research, and offices, both for faculty and graduate students, was a recurrent theme of our interviews on campus.

Comments of the Future Direction of the Degree Program(s)

The following recommendations were made:

1. Develop programs that are unique to Canada's North and that can serve the needs of the industries situated in Northern Canada
2. Re-evaluate the stand-alone Environmental Engineering as having two similar programs may limit the number of students
3. Improve and make more transparent the self-improvement aspect of course evaluations.

III. SUMMARY OF THE REVIEWERS' RECOMMENDATIONS

RECOMMENDATIONS	DESCRIPTION OF THE RECOMMENDATION
One	Improve course evaluations and related feedback to students; including improving and make more transparent their self-improvement component. Allow the programs and courses to intentionally evolve to become progressively better.
Two	Evaluate the need for a stand-alone environmental program
Three	Strengthen ties with industry and the community
Four	Improve course scheduling
Five	Create a minimum funding threshold for graduate students
Six	Promote more broadly the superb M.Eng. program in wood
Seven	Explore developing new programs that are unique to Canada's North that can directly serve the needs of the industries and opportunities in Prince George and in Northern Canada
Eight	Reevaluate the stand-alone Environmental Engineering as having two similar programs may limit the number of students
Nine	Increase the amount of space available for the SoE on campus

School of Engineering

Civil Engineering

Environmental Engineering

Environmental Engineering Joint Program UNBC/UBC

Master of Engineering in Integrated Wood Design

Master of Applied Science in Engineering

PhD in Engineering (proposal)

Faculty of Science and Engineering

Chair: Mauricio Dziedzic

Dean: Deborah Roberts

Provost and Vice President, Academic: Bill Owen

Date UNBC Received the External

Review of Degree Programs Report: June 12, 2024

Please Note: The Responses to the External Review of Degree Program(s) Report, Action Plan and the 36 Month Action Plan Progress Report are made publicly available on the Provost's website.

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PART 1 – ACADEMIC ADMINISTRATIVE UNIT’S RESPONSE TO THE EXTERNAL REVIEW OF DEGREE PROGRAM(S) REPORT

August, 2024

**I. Overall Impression of the Summary of Findings and Recommendations from the
External Review of Degree Program Report**

Positive, as the report correctly identifies areas of strength and weakness. The reviewers identified ten points as major strengths of the programs, including the quality of the program, the faculty, the students, and the existing laboratories. They also identified nine areas for improvement, having made suggestions on how to proceed.

II. Correction of Factual Errors or Areas of Misunderstanding in the Report

No factual errors or areas of misunderstanding were identified in the report.

PART 2 - ACTION PLAN

What steps does the Academic Administrative Unit intend or propose to take in response to the recommendations from the *External Review of Degree Program(s) Report*?

UNBC Responses to the External Review of Degree Program(s) Report			
1	Recommendation	Improve course evaluations and related feedback to students; including improving and making more transparent their self-improvement component. Allow the programs and courses to intentionally evolve to become progressively better.	
	Action	Implement course evaluations for all courses in the School of Engineering, providing feedback to the students including any changes resulting from the process. It should be noted that these evaluations will not be used for tenure and promotion, but only for program quality control.	
	Person(s) Responsible	All SoE instructors	
	Target Implementation Date	Fall 2024	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	Course evaluations conducted by the SoE and shared with each respective instructor for reflection, feedback to the students, and action
		24 month Action Plan Progress Report	Course evaluations conducted by the SoE and shared with each respective instructor for reflection, feedback to the students, and action. Review of the survey and prof feedback from the previous year.
		36 month Action Plan Progress Report	Course evaluations conducted by the SoE and shared with each respective instructor for reflection, feedback to the students, and action. Review of the survey and prof feedback from the previous year.
2	Recommendation	Evaluate the need for a stand-alone environmental program	

	Action	Do nothing. Not enough data is available to make a decision at this point. Recruitment efforts are being enhanced, and a few years are needed before enough evidence is available upon which to make a decision.	
	Person(s) Responsible		
	Target Implementation Date		
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>Not applicable</i>
		24 month Action Plan Progress Report	<i>Not applicable</i>
		36 month Action Plan Progress Report	<i>Not applicable</i>
3	Recommendation	Strengthen ties with industry and the community	
	Action	Create the SoE Industry Advisory Board (IAB)	
	Person(s) Responsible	SoE Chair	
	Target Implementation Date	December 2024	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>SoE IAB terms of reference and action plan. Report on other community activities.</i>
		24 month Action Plan Progress Report	<i>SoE IAB annual report. Report on other community activities</i>
		36 month Action Plan Progress Report	<i>SoE IAB annual report. . Report on other community activities</i>
4	Recommendation	Improve course scheduling	
	Action	Improve DCU data entry and review automatically generated schedule to promote balanced course loads for all SoE students	
	Person(s) Responsible	SoE AAs. faculty and students	
	Target Implementation Date	February 2025	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>2025-26 schedule</i>
		24 month Action Plan Progress Report	<i>2026-27 schedule</i>
		36 month Action Plan Progress Report	<i>2027-28 schedule</i>
5	Recommendation	Create a minimum funding threshold for graduate students	

	Action	Engage ORI in conversations about using a percentage of the overhead brought into UNBC by SoE research funding to increase the number of scholarships available to SoE graduate students	
	Person(s) Responsible	Dean and Chair	
	Target Implementation Date	Fall 2025	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>ORI - SoE graduate funding policy</i>
		24 month Action Plan Progress Report	<i>Number of scholarships awarded and % of SoE graduate students funded</i>
		36 month Action Plan Progress Report	<i>Number of scholarships awarded and % of SoE graduate students funded</i>
6	Recommendation	Promote more broadly the superb M.Eng. program in wood	
	Action	Develop a communications strategy to promote the MEng in Integrated Wood Design both in Canada and abroad	
	Person(s) Responsible	MEng faculty and Chair	
	Target Implementation Date	October 2024	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>MEng enrollment – 2025-26</i>
		24 month Action Plan Progress Report	<i>MEng enrollment – 2026-27</i>
		36 month Action Plan Progress Report	<i>MEng enrollment – 2027-28</i>
7	Recommendation	Explore developing new programs that are unique to Canada’s North that can directly serve the needs of the industries and opportunities in Prince George and in Northern Canada	
	Action	Promote discussion on this topic within the SoE, seek input from the SoE IAB and the local engineering community and make recommendations to pursue any options that arise from the process. Look at rebranding the solo environmental engineering program	
	Person(s) Responsible	SoE faculty, SoE IAB	
	Target Implementation Date	Fall 2025	
	Implementation Details <i>[Targeted actions/deliverables during period]</i>	12 month Action Plan Progress Report	<i>Summary of recommendations</i>
		24 month Action Plan Progress Report	<i>Program proposal submission to UNBC</i>
		36 month Action Plan Progress Report	<i>Program proposal submission to DQAB</i>
8	Recommendation	Reevaluate the stand-alone Environmental Engineering as having two similar programs may limit the number of students	

	Action	The recommendation does not match the identified weakness. Perhaps the intent of the reviewers was to recommend considering a new undergraduate program in Wood Engineering, as mentioned elsewhere in their report. In this case, the action will be: develop a draft proposal for an undergraduate degree in Wood Engineering to investigate its feasibility. The stand-alone and the joint Environmental Engineering programs are already distinct, as they have different curricula for 3 rd and 4 th year, and different educational experiences for the students.	
	Person(s) Responsible	SoE undergraduate curriculum committee	
	Target Implementation Date	Fall 2025	
	Implementation Details [Targeted actions/deliverables during period]	12 month Action Plan Progress Report	Draft program proposal and feasibility analysis
		24 month Action Plan Progress Report	Seek internal approval, if proposal deemed feasible
		36 month Action Plan Progress Report	Submit to DQAB
9	Recommendation	Increase the amount of space available for the SoE on campus	
	Action	Identify the needs of the SoE, seek internal support for implementation, seek sources of funding	
	Person(s) Responsible	Chair, Dean, SoE IAB	
	Target Implementation Date	Fall 2025	
	Implementation Details [Targeted actions/deliverables during period]	12 month Action Plan Progress Report	UNBC's position on proposed course of action
		24 month Action Plan Progress Report	Sources of funding identified
		36 month Action Plan Progress Report	Construction starts

FOLLOW UP DATES

As per the *External Review of Degree Program(s) Procedures*, the Academic Administrative Units are responsible for submitting Action Plan Progress Reports to the Dean on the following dates:

- 12 month Action Plan Progress Report: August 31, 2025
- 24 month Action Plan Progress Report: August 31, 2026
- 36 month Action Plan Progress Report: August 31, 2027

PART 3 – DEAN’S AND PROVOST AND VICE PRESIDENT, ACADEMIC’S RESPONSES

I. Summary of the Degree Program Review Process

The review process was well organized, and I feel the reviewers were very diligent in their assessment of the program and the recommendations that they made. Since the accreditation process is known to the reviewers and covers much of the learning outcomes and curricular aspects, the recommendation from the reviewers included more big picture items. They listed 10 strengths of the programs as they saw them and listed 9 weaknesses. They also provided 3 comments for future directions.

II. Dean’s Response to the Recommendations and Action Plan (August 27, 2024)

Dr. Dziedzic not only drafted a response to the recommendations based on his own reactions to the reviews but presented this to the School faculty members and provided them the opportunity to respond, thus increasing the chances that all members of the School of Engineering will take responsibility for the desired actions. My response to the SoE responses are below. The numbers are the same as the numbering system the reviewers and Dr. Dziedzic used.

1. I agree with the response. There is a set of questions that we have been using for the AA assisted evaluations that could be used. I would like to add in that Dr. Ben Daniels is leading a student experience survey that may result in a different set of questions and a different process. SoE will need to be in step with the new process as it will be developed for all UNBC. I encourage Dr. Dziedzic to work with Dr. Daniels so our transition is smooth. Having the University perform the surveys can help with the anxiety that students feel about possible retribution when it is done by faculty members. I also agree that we must do more than just survey the students, but help our faculty learn to show them in class that the surveys are being read and listened to. One suggestion to add might be for the School to offer to help with in-term surveys. There is data that shows that when in-term surveys are done, and the professor indicates they have read the surveys and explains the actions taken. Even if they do nothing, but explain why whatever is the way it is student morale improves. This can still be challenging for students that are afraid of retribution and we have small classes, but there are way to help with that. Dr. Danielas can be a good resource for this.

I would also suggest that you add a review of the usefulness of the survey, how the professors are communicating back to the students and resample student impressions during the implementation period that also includes the next accreditation information collection cycle. This exercise would also provide information for accreditation and our continuous improvement report.

2. I agree that no action need be taken for the stand-alone program at this time. It is not costing us anything since the majority of the courses are in common with either the Civil program or the Joint

- environmental program. We will keep an eye on this program and would definitely not hire any new faculty strictly to the stand alone program.
3. I agree that the development of the School of Engineering industry advisory board will go a long way to strengthen the ties to the community. I also know that there are discussions with the Mayor of Prince George and the development of a vision between UNBC Engineering and the City of Prince George. I encourage those activities to continue. I also want to add that the work that has been done for high school competitions and more visits to regional high schools are also work that the School is doing to help strengthen community ties. I would also include the progression of these in the reports of the implementation of the plans for this recommendation.
 4. I agree that the accuracy of the data going in to the DCU is important. I would also encourage the chair and the AAs to develop strong and positive relations with the scheduling team to ensure a common understanding of the needs of engineering students.
 5. I am not sure of the success in the ability of the return of any indirect costs to engineering. I do know there is a push for a minimum support for all grad students at UNBC but that there are barriers/difficulties in creating this. Engineering is not at steady state yet, but it could be possible to look at the Engineering budget to see what can be done within that to help fund graduate students in engineering.
 6. I agree with the response and look forward to seeing this come to fruition.
 7. I do not agree with spending much of our energy on new engineering programs until we can at least get the Civil program to the numbers that the Province has set. The province has indicated we will not get new funding for new tech seats (which includes engineering) until we fill the seats we have. I do not see how we can introduce a new program without new funds. We could try and rebrand the solo environmental program to something new that would not require any new people or lab space. That might differentiate it from the joint program.
 8. I agree that the concern in the table is a repeat. It could be possible to look at a wood engineering undergraduate if it could be done within our current complement of faculty. This might be a good interest once Dr. Tannert's NSERC chair runs out and he will need to assume a regular teaching load.
 9. I wholeheartedly agree that space for engineering is a concern and will include this as a one of my strategic goals.
-

III. Provost and Vice President, Academic's Response to the Recommendations and Action Plan December 16th, 2024

Regular and comprehensive degree program reviews support the commitment of the university and its faculty and staff to the quality, accountability, sustainability, and continuous improvement of UNBC's degree programs and academic service units. Thank you to the review committee, the department faculty, staff, and

students, central administration, and the Faculty Dean for their participation in the program review for the School of Engineering.

I have carefully read the reviewers' report, the departmental response, and the decanal response. A meeting with the dean and chair on December 5, 2024, provided important additional context. I want to underscore the authority and responsibility of the dean and department for a large majority of the recommendations.

I broadly agree with the recommendations of the external review committee and how these recommendations have been incorporated into the departmental action plan. I also appreciate that the Department has already taken steps that align with the key recommendations.

As is usually the case, the external review committee has made recommendations that have some degree of resource implications. Whereas I broadly support suggestions to improve marketing, graduate scholarships, and increasing space availability for the School of Engineering, recommendations and actions that necessitate acquiring new resources or reallocation of resources will take some time to achieve and must align with the strategic direction and goals of the department and faculty.

I look forward to seeing the department's work on the action plan and to hearing about the positive impact on the program.