ACADEMIC COUNCIL MEETING
UNDERGRADUATE STUDIES COMMITTEE (USC)

AGENDA
October 20, 2026
9:00 a.m. - 10:15 a.m.
Via Videoconference
Public Registration Link

USC Meeting Schedule and Materials 2026-2027

No.		Topic	Lead	Suggested Start Time
PUBLIC SESSION				
1.		**Call to Order and Land Acknowledgement**	Chair	9:00 a.m.
2.		**Agenda (M)**		
3.		**Chair's Remarks**		
	3.1	Annual USC Terms of Reference Review * (I)		
4.		**2026-2027 USC Workplan Review* (I)**	N. Crow	9:15 a.m.
5.		**New Program Proposal (Recommendation)**		
	5.1	Faculty of Engineering and Applied Science: Bachelor of Engineering (Hons), Civil Engineering* (M)	M. Agelin-Chaab	9:20 a.m.
6.		**Major Program Modification (Recommendation)**		
	6.1	Faculty of Science: Bachelor of Science (Hons) in Biological Science – Biochemistry Specialization* (M)	R. Fortier	9:35 a.m.
7.		**Minor Program Adjustment (Approval)**		
	7.1	Faculty of Health Sciences: Medical Laboratory Science – Bridge – Advanced Diploma in Biotechnology* (M)	J. McCabe	9:50 a.m.
8.		**Consent Agenda* (M)**	Chair	10:10 a.m.
	8.1	Public Minutes of the June 16, 2026 Meeting* (M)		
	8.2	Minor Curricular Changes: (I) 8.2.1 Course Changes: BIOL 2030U, BIOL 3032U, ENGR 1015U, FSCI 4120U, HLSC 2201U		
	8.3	Minor Curricular Changes: (I) 8.3.1 New Courses: ARTI 1000U, BIOL 4600U, HLSC 3700U		

	8.4	Minor Curricular Changes: (I) 8.4.1 Reinstate a Closed Course: INFR 4621U, POSC 3600U		
9.		**Termination (M)**	Chair	10:15 a.m.

Nicola Crow, University Secretary

Undergraduate Studies Committee (USC)

2026-2027 Work Plan
Subject to change based on items arising during course of year

Meeting	Agenda Item (Lead)	Academic Council (If Applicable)	Board (if Applicable)
October 20, 2026	• Curriculum Items – if applicable **(CIQE)** • 2026-2027 USC Workplan **(US)** • Annual USC Terms of Reference Review **(US)** • Policy deliberation (if applicable)	**November 24, 2026**	**December 3, 2026**
December 15, 2026	• Curriculum Items – if applicable **(CIQE)** • 2027-2028 U/G Academic Schedule **(RO)** • Policy deliberation (if applicable)	**January 26, 2027**	**March 4, 2027**
January 19, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable) ***Major Program Modification (MPM) Deadline (CIQE)*** • Target last meeting to accept MPM's (Academic Council deadline March); changes published to calendar in May ***Academic Policy Changes*** • Target last meeting to accept Academic Policy changes (Academic Council deadline March); changes published to calendar in May	**March 23, 2027**	**March 4, 2027**
February 16, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable) ***Minor Program Adjustments (MPA) Deadline (CIQE)*** • Target last meeting to accept MPA's (Academic Council for information deadline - March); changes published to calendar in May	**March 23, 2027**	**May 6, 2027**

	Minor Curriculum Changes (MCC) Deadline (CIQE) • Target last meeting to accept MCC's for information - Does not go to Academic Council; published to calendar in May		
March 16, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable)	**May 25, 2027**	**May 6, 2027**
April 20, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable)	**May 25, 2027**	**June 24, 2027**
May 18, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable)	**June 15, 2027**	**TBD**
June 15, 2027	• Curriculum Items – if applicable **(CIQE)** • Policy deliberation (if applicable)	**Sept 2027 TBD**	**TBD**

UNDERGRADUATE STUDIES COMMITTEE REPORT

ACTION REQUESTED:

Recommendation	☒
Decision	☐
Discussion/Direction	☐
Information	☐

DATE: **20 October 2026**

FROM: **Faculty of Engineering and Applied Science**

SUBJECT: **New Program Proposal – Bachelor of Engineering (Hons), Civil Engineering**

COMMITTEE MANDATE:
In accordance with the USC Terms of Reference, USC has the responsibility to examine proposals for new undergraduate degree programs and major changes to existing programs and to recommend their approval, as appropriate, to the Academic Council.

MOTION FOR CONSIDERATION:
That USC hereby recommends to Academic Council the approval of the Bachelor of Engineering (Hons) in Civil Engineering program and the subsequent recommendation of the program to the Board.

BACKGROUND/CONTEXT & RATIONALE:
The proposed Bachelor of Engineering (Hons), Civil Engineering is a four-year program designed to prepare students for the planning, design, analysis, construction, operation, and enhancement of sustainable and resilient infrastructure that supports society and economic activity. The program equips graduates with the knowledge and skills required to design, assess, and manage structural, transportation, geotechnical, environmental, and municipal infrastructure systems. Students will develop a comprehensive foundation in civil engineering while integrating Artificial Intelligence (AI) applications with core engineering principles. Through specialized coursework and project-based learning, the program prepares graduates to develop and implement intelligent solutions that enhance the resilience, efficiency, and sustainability of infrastructure systems.

The program responds to the growing demand for engineers who can address the challenges of rapid urbanization, climate change, and technological advancement through the planning, design, and management of sustainable infrastructure. Building on fundamental civil engineering principles, the curriculum incorporates advanced analytical, computational, and digital tools to prepare graduates for contemporary engineering practice and emerging technologies.

Upon completion of the program, graduates will demonstrate a broad and in-depth understanding of mathematics, natural sciences, engineering science, and engineering design as applied to civil infrastructure systems. They will be able to formulate and solve complex engineering problems using

appropriate analytical, numerical, experimental, and computational methods, including AI-enabled approaches. Graduates will also be able to design sustainable and resilient infrastructure solutions that balance technical performance, safety, economic feasibility, environmental stewardship, and societal needs.

RESOURCES REQUIRED:

The proposed Civil Engineering program will utilize existing courses from the Faculty of Engineering and Applied Science (FEAS), in addition to new fundamental courses in Civil Engineering. Most of the added courses are offered in the third and the fourth years of the program. The proposed Civil Engineering program will share the same common first year with all other engineering programs at Ontario Tech along with the Common Capstone in fourth year. The mode of delivery for the program will be in person with a few courses hybrid/online, consistent with the other engineering programs. This format supports effective engagement with complex engineering concepts through direct interaction between students and instructors, real-time discussion, and collaborative problem-solving.

Consistent with the structure and growth of engineering programs at Ontario Tech, strong enrolment growth is anticipated for the proposed Civil Engineering program as it matures. As institutional resources are tied to enrolment, careful monitoring of enrolment trends across the sector, and specifically their impact on this program, will be required to ensure that existing resources are leveraged to the fullest extent and that any new hires resulting from enrolment increases are positioned to support growth across the program.

This careful and phased approach to investment will be essential to uphold academic quality, foster innovation, respond to evolving student demand, ensure long term resource sustainability, and remain competitive in a rapidly evolving academic and technological landscape.

A minimum faculty complement of six professors (5 TTT and 1 TF) with a background in Civil Engineering are required to cover the new CIVE courses in the program and to have sufficient faculty with program specific expertise to meet accreditation requirements.

The addition of this new program and growth within existing engineering programs will most likely require additional sections of existing courses. Additional teaching resources including instructors and TAs will be required for these additional sections. Similarly, for the service courses offered by the Faculty of Science and the Faculty of Social Science and Humanities, there will be a need to offer an additional section of each of the service courses with a corresponding need for instructors and TAs.

Consultation with the Provost's Office will continue through the planning process to review the financial implications of faculty hiring, space development, and capital equipment investments, and to align the resource plan with institutional priorities and budget frameworks.

CONSULTATION AND APPROVAL:

- ✓ Academic Resource Committee: 12 May 2026
- ✓ FEAS Faculty Council: 1 October 2026
- Undergraduate Studies Committee (Recommendation): 20 October 2026
- Academic Council (Approval and Recommendation): 24 November 2026
- Board of Governors (Approval): 4 March 2027

A thorough consultation process has been undertaken with the Deans of FSci and FSSH about the expected impact of the new program on service courses.

NEXT STEPS:

- Pending the recommendation of USC, the program proposal will be presented to Academic Council for approval and recommendation to the Board. The proposal must proceed through the following external approval steps:
  - Ontario Universities Council on Quality Assurance
  - Ministry of Colleges, Universities, Research Excellence and Security

Full implementation of the program is expected by Fall 2028 following a complete recruitment cycle. Should the opportunity exist, students may be admitted beginning in Fall 2027 through the program's Comprehensive Engineering first year.

SUPPORTING REFERENCE MATERIALS:

- New Program Proposal with Appendices
- Reports from External Review

New Undergraduate Program Proposal

The program proposal and accompanying documents must address the purpose and content of the new program and the capacity of the unit to deliver a high-quality program. This template is for all proposals for new undergraduate programs and aligns with Ontario Tech Institutional Quality Assurance Process (IQAP) requirements and, together with the required supporting documents, will help to ensure that all evaluation criteria established by the Quality Council are addressed. All sections of the template are required.

Full name of proposed program (as it will appear on the student's transcript): (e.g., Bachelor of Arts in Psychology; Bachelor of Science in Biology)	Bachelor of Engineering (Honours), Civil Engineering Bachelor of Engineering and Management (Honours), Civil Engineering Bachelor of Engineering (Honours), Civil Engineering, Co-operative Education
Degree designation and short form: (e.g., Bachelor of Arts, B.A.; Bachelor of Science, B.Sc.)	BEng (Hons)
Cost recovery program:	☐Yes ☒No
Professional program:	☒Yes ☐No
Faculty offering the program: (i.e., where the program will be housed/site of academic authority)	Faculty of Engineering and Applied Science
Collaborating Faculty(ies) (if applicable):	
Collaborating institution(s) (if applicable):	
Program delivery location:	Ontario Tech University - North Campus 2000 Simcoe St N, Oshawa, ON L1G 0C5
Proposed program start date (please change as needed):	Fall 2028
Program proponent/contact:	Hossam Kishawy and Dima Jawad
Version date (please change as you edit this proposal):	October 2026

Date of Academic Council Approval:	

Brief **description of the proposed program[1]:** (NOTE: Text box is formatted to limit the description to 1000 characters or less. This description should be identical to the 'Program Abstract' on page one of the proposal.)

The Bachelor of Engineering (Honours) in Civil Engineering prepares students to plan, design, analyze, construct, and manage the infrastructure systems that support society and economic development. The program provides a strong foundation in structural, transportation, geotechnical, environmental, municipal, and railway engineering, while emphasizing sustainable and resilient infrastructure. Students will develop the technical and professional competencies required to address contemporary engineering challenges through project-based and experiential learning. Distinctive features of the program include the integration of Artificial Intelligence (AI) and digital technologies in civil engineering applications, preparing graduates to design smarter and more efficient infrastructure systems. The program also offers specialized learning opportunities in railway engineering, reflecting the growing demand for expertise in sustainable transportation infrastructure. Graduates will be well positioned for careers in the public and private sectors or for further graduate studies.

[1] NOTE: Following the Quality Council's approval of the proposed program, the QA Secretariat will seek confirmation from the University that this description is appropriate to post on the Quality Council's website (Approved Programs — Ontario Universities Council on Quality Assurance (oucqa.ca))

New Undergraduate Program Proposal

Bachelor of Engineering (Hons), Civil Engineering
Faculty of Engineering and Applied Science

1 Program Abstract

Please provide a brief overview of the proposed program, summarizing the key points, to be shared with the public, in 1000 characters or less. You may wish to include:

- *A clear statement of the purpose of the program (who is it for, what are the outcomes)*
- *Any program components, such as fields, pathways, or micro-credentials (note that fields, pathways, and micro-credentials are not required)*
- *Nature of the learning environment, noting any distinctive elements, including alternative modes of delivery (including online)*

Note that this statement will be used on a standalone basis and is for external purposes; what do you want potential students/advisors to know about this program? (You may wish to complete this section last.)

The Bachelor of Engineering (Honours) in Civil Engineering prepares students to plan, design, analyze, construct, and manage the infrastructure systems that support society and economic development. The program provides a strong foundation in structural, transportation, geotechnical, environmental, municipal, and railway engineering, while emphasizing sustainable and resilient infrastructure. Students will develop the technical and professional competencies required to address contemporary engineering challenges through project-based and experiential learning. Distinctive features of the program include the integration of Artificial Intelligence (AI) and digital technologies in civil engineering applications, preparing graduates to design smarter and more efficient infrastructure systems. The program also offers specialized learning opportunities in railway engineering, reflecting the growing demand for expertise in sustainable transportation infrastructure. Graduates will be well positioned for careers in the public and private sectors or for further graduate studies.

2 Academic Rationale

- *Identify what is being proposed, clearly state the program objectives, and provide an academic rationale for the proposed program (what is being created and why?)*
- *Explain the appropriateness of the program name and degree nomenclature, particularly as they relate to the program objectives; list any program specializations, pathways, etc.*
- *Describe the mode of delivery (in-class, hybrid, online) and any work-integrated learning; outline how the delivery and components are appropriate to support students in achieving the Degree Level Expectations, program outcomes, and Program Learning Outcomes*
- *Discuss how the program addresses the current state of the discipline or area of study*
- *Describe the ways in which the program fits into the broader array of program offerings within the Faculty and the University*
- *Describe any unique curriculum or program innovations, creative components, or significant high impact practice*

The proposed program is a Bachelor of Engineering (BEng) Honours in Civil Engineering with an emphasis on sustainable and resilient infrastructure systems, including transportation and energy infrastructure. The program is designed to address the growing need for engineers capable of planning, designing, and managing sustainable and resilient infrastructure systems in the context of rapid urbanization, climate change, and technological development. It builds upon core Civil Engineering principles while incorporating advanced analytical and digital tools, ensuring graduates are prepared for modern engineering practice and future technological developments. Upon completion of the program, graduates will demonstrate depth and breadth of knowledge in mathematics, natural sciences, engineering science, and engineering design as applied to infrastructure systems. They will be able to formulate and solve complex engineering problems using appropriate analytical, numerical, and experimental methodologies, including modern computational modeling techniques and AI applications. Graduates will possess the ability to design and develop sustainable and resilient infrastructure solutions that account for technical performance, safety, economic feasibility, and societal impact.

The proposed Civil Engineering program will utilize existing courses from the Faculty of Engineering and Applied Science (FEAS), in addition to new fundamental courses in

Civil Engineering. Most of the added courses are offered in the third and the fourth years of the program. The proposed Civil Engineering program will share the same common first year with all other engineering programs at Ontario Tech along with the Common Capstone in fourth year. The mode of delivery for the program will be in person with a few courses' hybrid/online, consistent with our other engineering programs. This format supports effective engagement with complex engineering concepts through direct interaction between students and instructors, real-time discussion, and collaborative problem-solving.

The Faculty's existing Railway Engineering Specialization will be an option available for students in the Civil Engineering program. In addition, both the Co-op Program and Management option will be available to students.

3 University Mission, Vision, Integrated Academic and Research Plan, and Strategic Mandate Agreement

- *Detail the consistency of the program objectives with the Mission, Vision, Integrated Academic and Research Plan, and Strategic Mandate Agreement*
- *Describe how the program contributes to the University's Mission and Vision*
- *Explain how the program aligns with the goals and priorities outlined in the Faculty's(ies') and University's Integrated Academic and Research Plan*
- *Is this program consistent with the mandate of the sector? (i.e. technically/vocationally/theoretically/academically oriented for universities) Identify how the program fits within one or more areas of strength or growth in Ontario Tech University's Strategic Mandate Agreement*

The mission of Ontario Tech is "Innovating to improve lives and the planet by incorporating technology-enhanced learning strategies and promoting the ethical development and use of technology for good through intensive research and inquiry." The proposed Civil Engineering program directly advances this mission by embedding artificial intelligence, machine learning, and computational methodologies into the analysis and design of sustainable, resilient infrastructure systems, ensuring that technological innovation is applied responsibly to address social needs and environmental challenges.

The program will further reinforce FEAS's and Ontario Tech's relevance within an evolving job market by offering a degree aligned with industry priorities. Through the

integration of AI applications into key infrastructure areas such as railway engineering, highway design, and intelligent transportation systems, the program addresses the growing need for engineers proficient in data-driven analysis and intelligent system design. This focused program positions Ontario Tech distinctively among regional institutions, where a comparably integrated AI-centered infrastructure curriculum is not currently offered.

The program's emphasis on sustainable infrastructure naturally encompasses energy infrastructure systems, which play a critical role in supporting climate resilience, infrastructure modernization, and sustainable economic development. This emphasis aligns with Ontario Tech University's technology-focused mission and responds to provincial priorities related to sustainable infrastructure investment and Canada's transition toward more resilient and sustainable infrastructure systems.

4 Need, Demand, and Duplication

Provide evidence of the need and demand for the program and how this has been determined, focusing on:

- *Student interest:*
  - *including number of prospective student inquiries, applications and registrations for similar programs, results from surveys/focus groups of existing students, graduates, or professionals in the field (include information about domestic vs. international student interest)*
- *Societal need:*
  - *including evidence of the need for graduates of the program and in which fields (within academic, public, and/or private sectors);*
  - *employment opportunities for prospective graduates, indicating at least three occupations in which graduates from this proposed program may be employed, selecting at least one using the Ontario Job Futures website and one from the Government of Canada Labour Market Trends website; you may also wish to review the Durham Workforce Authority website and provide any relevant sector portfolio or local/community impact information;*
  - *for professional programs, a description of the program's congruence with current regulatory requirements*
  - *note if any employers in the area support the need for this program and include a letter(s) of support as an additional appendix*

Civil engineering ranked among the disciplines with the highest undergraduate enrolment in Canada in 2022[2], with Ontario holding one of the largest shares of national enrolment in engineering, tied with Quebec. This strong demand reflects sustained student interest in civil engineering career and the continued need for skilled engineers by the industry. Introducing a Civil Engineering program focused on infrastructure and integrated with AI applications positions the University to capitalize on this demand while responding to evolving industry expectations. By offering a distinctive program that combines core infrastructure engineering with AI-driven design and analysis, an option not currently available at neighboring institutions, Ontario Tech can enhance its competitive advantage and attract increased undergraduate enrolment.

There is growing societal demand for graduates with expertise in infrastructure engineering. Ontario plans to invest $190 billion in infrastructure over 10 years, and investment is projected to increase from $15.6 million annually in 2023 to $21.7 million annually in 2023[3]. Canada is facing infrastructure renewal requirements due to climate adaptation challenges, transportation modernization, and rapid urban development. Federal and provincial investments in transportation networks, climate-resilient infrastructure, and smart cities further increase the need for engineers equipped with advanced analytical and digital competencies.

Numerous of our industry partners, including AtkinRéalis, Alstom, and ES Fox, have expressed a strong interest and are in support of the proposed Civil Engineering program. Please see Appendix J for feedback from our stakeholders.

Graduates from the program may be employed in: 1) the private sector where demand exists within consulting engineering firms, construction companies, and technology companies developing smart infrastructure solutions; 2) the public sector where municipalities, provincial ministries of transportation, and utility firms require engineers capable of planning, designing, and managing resilient infrastructure systems; and 3) the academic and research sectors where there is growing interest in intelligent infrastructure systems and climate-resilient design, creating pathways for graduate studies and research careers.

[2] https://engineerscanada.ca/reports/enrolment-and-degrees-awarded-report/2022-canadian-engineers-for-tomorrow

[3] https://www.ontario.ca/document/ontarios-long-term-report-economy-2024/chapter-4-delivering-infrastructure-long-term-2024

- *Describe how the program is distinct from other programs at Ontario Tech. Is it reasonable to anticipate this program might affect enrolment in other related programs? If so, how might this be addressed?*

The proposed Civil Engineering program is distinct from the existing Engineering programs offered at Ontario Tech and will attract new students to the University.

- *Is this a new area of study? Please explain:*

Civil Engineering is not a new area, but the proposed program represents a modern approach to the topic, in particular its focus on the design and development of sustainable infrastructure through the integration of AI tools. This innovative program is unique in Ontario and positions the University to capitalize on the demand for graduates who are prepared to develop modern, sustainable infrastructure.

- *Identify similar or complementary programs offered by other universities with specific reference to Ontario and Canadian examples, using the table in the Appendix. Please be brief but specific in the table. Avoid value-based statements; rather, focus on need and demand, describing how the proposed program is similar to or different from existing programs. Please fill out and refer to the table in the Appendix when discussing the comparator programs*
- *Provide additional overall comment on the justification for any duplication*

Although elements of the proposed Civil Engineering program overlap with existing programs offered at other institutions, there is no specialized pathway for infrastructure engineering in these regional institutions. The justification for introducing this program lies in its distinctive systems-oriented structure, its integration of AI and Machine Learning across infrastructure domains, and the inclusion of specialized courses such as highway and modern railway engineering that are not comprehensively combined in comparable programs. Please see Appendix A for a list of comparator programs.

5 Enrolment Information

- *Please complete Table 1 and provide, in paragraph form, information regarding enrolment projections*
- *Please determine the academic year when the program enrollment will reach a steady-state and add an asterisk (*) in the corresponding box beside the number*

- *This table should reflect normal estimated program length. (Table may be adjusted as necessary.)*

Table 1: Projected Enrollment by Academic and Program Year

	Academic Year					
	2028-2029	2029-2030	2031-2032	2032-2033	2033-2034	2034-2035
Level of Study						
1st year	60	80	100	120	120	120
2nd year		54	72	90	108	108
3rd year			41	68	86	103
4th year				27 + 12 on Internships	45 + 20 on Internships	57 + 25 on internships
5th year					12	20
Total Enrollment	60	134	213	317	391	433

	Academic Year					
	2035-2036	2036-2037	2037-2038	2038-2039	2039-2040	2040-2041
Level of Study		*				
1st year	120	120	120	120	120	120
2nd year	108	108	108	108	108	108
3rd year	103	103	103	103	103	103
4th year	69 + 29 on internships	69 + 29 on internships	69 + 29 on internships	69 + 29 on internships	69 + 29 on internships	69 + 29 on internships
5th year	25	29	29	29	29	29
Total Enrollment	454	458	458	458	458	458

Table 1 presents the projected enrolment for the program. The numbers assume the following (based on current attrition rates in engineering programs at Ontario Tech): 10% attrition from Years 1 to 2 and 5% attrition between Years 2 and 3 and between Years 3 and 4. It is important to note that the numbers in 4th year may change as some students take 12 to 16 month internships between Years 3 and 4 and come back for a fifth year to finalize their engineering degree. On average, this represents about 30% of students (consistent with other engineering programs at Ontario Tech). The enrolment intake will reach steady-state in 2032-2033 with the overall program reaching steady-state in 2036-2037 (due to the internship students).

6 Admission Requirements

Outline the formal admission requirements as they will appear in the Academic Calendar

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum grade of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U) and Physics (SPH4U). In addition, a combined minimum 70 per cent average in prerequisite math and science courses is required, with no grade below 60 per cent.

- *Explain how the program's admission requirements are appropriate for the program objectives and program learning outcomes: How will they help to ensure students are successful? How do they align with the learning outcomes of the program?*
- *Explain in detail any additional requirements for admission to the program such as minimum grade point average, special language, portfolio, etc. (and how the program recognizes prior work or learning experience, if applicable)*
- *Indicate the programs from which students may be drawn; if this is not a direct-entry from high-school program, please explain*

The entry requirements are consistent with all of the engineering programs at Ontario Tech.

Prerequisites in English, Advanced Functions, Calculus and Vectors, Chemistry, and Physics provide the essential mathematical, scientific, and communication foundations necessary for a degree in Civil Engineering. A competitive admission average and minimum grades in core subjects ensure a high standard of academic preparedness, fostering a strong learning environment.

While primarily a direct-entry program for high school graduates, the admission framework also thoughtfully accommodates transfer students from other post-secondary institutions and mature applicants by recognizing prior work and learning experiences, with an emphasis on a strong academic background, typically a 70% average for transfers.

7 Program Requirements, Learning Outcomes, Degree Level Expectations (DLEs), and Program Structure

Participate in program learning outcome (PLO) development sessions and complete the PLO mapping document to describe what the student will know or be able to do by the end of the program and how that knowledge or skill will be demonstrated; include the mapping document as an appendix; refer to the new PLOs and PLO mapping document to complete the questions in this section.

The Civil Engineering program has established seven Program Learning Outcomes (PLOs) that define the knowledge, skills, and competencies expected of graduates upon completion of the program:

PLO1	Apply knowledge of mathematics, physics, chemistry, engineering science, and engineering principles to identify, formulate, analyze, and solve civil engineering problems.
PLO2	Apply the engineering design process to develop and evaluate solutions to civil engineering design problems.
PLO3	Select and use computer-aided engineering software tools and contemporary technologies to solve civil engineering problems and to acquire, analyze, and process data.
PLO4	Work independently and as a member of multi- disciplinary and multi-cultural teams, in a variety of engineering and project environments.
PLO5	Communicate effectively in written, spoken, and visual form with both technical experts and with members of the general public on engineering matters
PLO6	Recognize and value the alternative outlooks that people from various social, ethnic, and religious backgrounds, as well as professions, may bring to civil engineering.
PLO7	Evaluate emerging technologies and recognize the importance of lifelong learning in supporting continued professional development.

A comprehensive curriculum and assessment mapping exercise was undertaken to align the Program Learning Outcomes (PLOs) with the program's Degree Level Expectations (DLEs), courses, and assessment methods. The resulting PLO mapping document (Appendix B) identifies where and how each PLO is addressed and assessed throughout the curriculum. It maps the PLOs to the courses in which they are developed, specifies the level at which they are achieved (Introduced, Reinforced, or Mastered), and identifies the assessment methods used to evaluate

student achievement, including tests, examinations, assignments, presentations, project reports, and laboratory reports. The mapping document provides clear evidence of the alignment between the curriculum, the PLOs, the DLEs, and the program's assessment strategy, demonstrating how students progressively develop and ultimately attain the knowledge, skills, and competencies expected of a Civil Engineering graduate.

Please see Appendix B for a list of the Program Learning Outcomes, Degree Level Expectations, Courses, and Assessments.

Discuss how the design, structure, requirements, and delivery of the program are appropriate for the program learning outcomes, program outcomes, and Degree Level Expectations. Guidance on program objectives and program-level learning outcomes, including examples, is available here. Be sure to include the following in your response:

- *The sequencing of required courses or other learning activities*

The course sequencing supports the Program Learning Outcomes (PLOs) and Degree Learning Expectations (DLEs) by progressively building core civil engineering knowledge and competencies. Foundational coursework in the first two years establishes essential principles in mathematics, science, and engineering fundamentals. In the upper years, advanced courses integrate specialized technical knowledge with applied analysis and design. Project-based learning, laboratory experiences, and Capstone design further reinforce these competencies, ensuring that graduates are well prepared for contemporary, ethical, and sustainable civil engineering practice.

- *The mode of delivery of the program (is this an online or hybrid program?)*

The program will be delivered in person and supports the Program Learning Outcomes (PLOs) and Degree Learning Expectations (DLEs) by enabling direct engagement with instructors, collaborative problem-solving, and hands-on learning essential to mastering complex engineering concepts and professional competencies.

- *Will the program be offered full-time and/or part-time; what is the program length for both full-time and part-time students; how will the program requirements reasonably be completed within the proposed time?*

The program is designed primarily for full-time study and can be completed within four years. It is important to note that fourth-year enrolment may vary, as some students pursue 12- to 16-month internship opportunities between Years 3 and 4 and return for an additional year to complete their degree requirements.

- *A clear indication of how faculty scholarship and research is integrated; provide a clear indication of how an understanding of research in this area will be reflected in curriculum and/or assessment*

Research is integrated into the program through research-informed course content and instructional approaches, and students demonstrate their understanding through assessments that require the application of current methods, critical evaluation of evidence, and research-based problem solving, particularly in upper-year courses and the capstone design project.

- *How the program will be administered*

The Program Learning Outcomes (PLOs) and Degree Learning Expectations (DLEs) provide a structured framework that enhances effective program administration by guiding curriculum planning, delivery, and continuous improvement. These outcomes establish shared expectations for faculty and administrators, supporting coherent course sequencing, alignment of teaching and assessment practices, and consistent evaluation of student progress. They also enable systematic monitoring of program quality and outcomes, inform evidence-based decision-making, and support accreditation, reporting, and ongoing curriculum review processes, ensuring the program remains responsive to disciplinary standards and institutional priorities.

- *The unique curriculum or program innovations or creative components in this program*
- *The ways in which the curriculum addresses the current state of the discipline*
- *If the program is to be accredited, include with the above details about the accreditation requirements and add the accreditation tables, if available, as an additional Appendix*

The Civil Engineering curriculum is designed to reflect the current state of the discipline by integrating foundational civil engineering knowledge with emerging technologies, contemporary industry practices, and evolving societal and infrastructure needs. The curriculum provides comprehensive coverage of the core areas of civil engineering, including structural, geotechnical, transportation, environmental, and municipal engineering, while incorporating modern approaches to sustainable and resilient infrastructure design and management.

A distinctive feature of the program is its focus on sustainable infrastructure, resilience, digital technologies and AI applications in civil engineering, and energy infrastructure, which are intentionally integrated throughout the curriculum. Advanced and specialized courses expose students to contemporary topics such as

Artificial Intelligence and Machine Learning, Intelligent Transportation Systems, Digital Water Infrastructure, Data Science in Geotechnical Engineering, and Digital Project Delivery. In addition, modern railway engineering represents a unique curricular component that addresses the growing demand for expertise in sustainable transportation infrastructure and distinguishes the program from comparable offerings.

The curriculum emphasizes experiential and project-based learning through laboratory experiences, design projects, and capstone courses that provide students with hands-on exposure to real-world infrastructure challenges and contemporary engineering tools and methodologies. These learning experiences ensure that graduates are well prepared to contribute to the planning, design, construction, operation, and modernization of civil infrastructure systems.

The proposed program has been developed to meet the requirements of the Canadian Engineering Accreditation Board (CEAB). The curriculum and accreditation units have been mapped to the applicable accreditation criteria. Please refer to Appendix C for the accreditation tables and Appendix K for the alignment of the program's focus areas with the Civil Engineering curriculum.

Describe how the principles of Equity, Diversity, Inclusion, and Decolonization have been considered:

- *Does the program contain concepts, materials, or resources from scholars/professionals who are part of one or more historically marginalized groups?*
- *Are multiple perspectives represented in the program, such as those offered by those who are Indigenous, Black, Persons of Colour, and/or 2SLGBTQIA+?*
- *How has accessibility been considered? More specifically, have the needs of students with disabilities been integrated into the program design (e.g., the ways that students are asked to demonstrate their learning)? Please provide information beyond the services offered by Student Accessibility Services*
- *Discuss how the program structure and delivery reflect universal design for teaching and learning and how the potential need to provide mental or physical health accommodations have been considered; describe how the program structure and delivery methods promote student well-being and resiliency and any elements that support a sense of community in the program*
- *Will this program provide space to allow for the discussion of other viewpoints outside the "dominant, Western narrative"?*

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all its courses and all its research activities. The material covered in this program considers the development of infrastructure that serves the public, so it is critical that EDID considerations are incorporated into the development of these systems, in particular ensuring these systems are accessible for all users. The courses, where appropriate, will cover these issues to ensure that students understand the importance of designing accessible systems that meet the needs of a diverse population.

FEAS is committed to Reconciliation. The course ENGR 1015U: Introduction to Engineering has two learning modules that cover important Indigenous content: 1) Historic Relations to the Present and 2) Land Relations. Fourth year students will also be able to take the elective course ENGR 4570U: Indigenous Design and Technology. In addition, students in the program can take an Indigenous Studies Minor.

As an example of its focus on EDI, FEAS has the Women in Engineering Society with the following goals :

- We foster a welcoming and engaging space for female engineering students to create a sense of community on and off campus.
- We connect female students to future employers and engineering career opportunities across Canada, and showcase successful female engineering professionals.
- We equip our students with professional skills, connections, and inspiration to prepare them for their professional careers.
- We give back to the community by running outreach events to encourage and inspire young women to pursue an education in engineering.

In addition to the above, FEAS's Engineering Outreach offers programs targeting Indigenous and black students to inspire and encourage them to pursue engineering.

For students who have accommodation needs, existing Student Accessibility Services (SAS) supports will be available to students who require specific accommodations.

Similar to other undergraduate programs at Ontario Tech University, this program will follow the Procedures for Academic Accommodation for Students with Disabilities: https://ontariotechu.ca/policy/policy-library/policies/legal,-compliance-and-governance/procedures-for-academic-accommodation-for-students-with-disabilities.php.

FEAS is committed to fostering an equitable and accessible academic environment in accordance with institutional policies and established accommodation practices. Students in the proposed Civil Engineering program will be supported in accessing appropriate accommodations through Student Accessibility Services and relevant central units. Program administration will support student well-being and academic success by incorporating structured mechanisms for student feedback, including participation in cyclical program reviews, surveys, and formal consultations. In addition, program-specific academic and co-curricular initiatives will be implemented to support student engagement, collegiality, and a cohesive academic community within the Civil Engineering program.

Does this Program contain any Indigenous content? ☒ Yes ☐No ☐Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted ☒ Yes ☐No If yes, when?

2021-2022

What was the advice you received from the IEAC, and how has it been included in your proposal?

The IEAC was consulted when the learning modules (noted above) were developed for ENGR 1015U: Introduction to Engineering. This course is taken by all engineering students. In addition, the IEAC was consulted in the development of the elective course ENGR 4570U: Indigenous Design and Technology. The feedback from the IEAC was incorporated in both these cases.

Did the IEAC ask you to return the proposal to them for review? ☐ Yes ☒ No

If yes, have they completed their review? ☐Yes ☐ No ☒ N/A

Is there an experiential learning component (e.g. workplace learning, co-op, internship, field placements, service learning, mandatory professional practice) to the program? If yes, please describe this component in 2500 words or less. Include confirmed partners, duration of the experiential learning component(s), and projected number of placements (where applicable) and provide letters of support.

Like other Engineering programs at Ontario Tech, Civil Engineering will include Co-op and Internship education opportunities to gain invaluable working experience prior to graduation. These experiential learning placements can range in duration from 4 to 16 months. Students in the Co-op stream who successfully complete three work terms (12 months) will graduate with the Co-op designation on their degree parchment.

8 Assessment of Teaching and Learning

Using examples from the PLO mapping document, address the following. Please see Guidance on Assessment of Teaching and Learning and speak with the Teaching and Learning Centre (TLC) for advice on how to satisfy these criteria.

- *Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and Degree Level Expectations*
- *Describe plans for documenting and demonstrating:*
  - *The overall quality of the program*
  - *Whether the program is achieving in practice its proposed objectives;*
  - *Whether the students are achieving the program learning outcomes and a level of performance consistent with the Degree Level Expectations; and*
  - *How the resulting information will used to inform continuous program improvement*

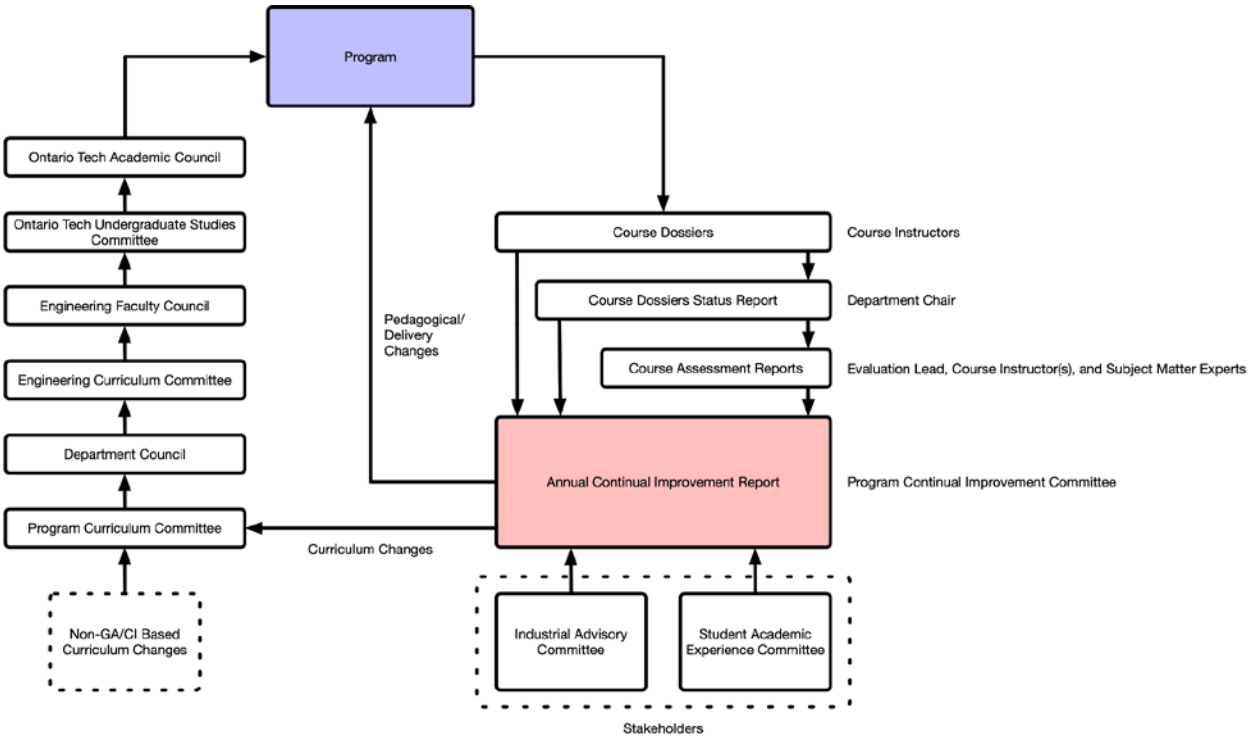
The assessment strategy for the Civil Engineering program has been developed through a comprehensive curriculum and assessment mapping exercise to ensure alignment between the Program Learning Outcomes (PLOs), Degree Level Expectations (DLEs), courses, and assessment methods. Each PLO has been mapped to the courses in which it is assessed, the level at which it is developed (Introduced, Reinforced, or Mastered), and the assessment methods used to evaluate student achievement.

The program employs a variety of assessment methods, including tests, examinations, assignments, presentations, project reports, and laboratory reports, to assess both technical and professional competencies. These assessment methods have been intentionally selected to align with the nature of the learning outcomes being evaluated and are distributed throughout the curriculum to provide students with multiple opportunities to demonstrate attainment of the PLOs. The assessment mapping exercise ensures that all PLOs are systematically and appropriately assessed

across the program and that students progressively develop the knowledge, skills, and competencies expected of Civil Engineering graduates.

The complete curriculum and assessment mapping document, including the alignment between courses, PLOs, DLEs, levels of achievement, and assessment methods, is provided in Appendix B.

A key part of meeting Canadian Engineering Accreditation Board (CEAB) requirements for accreditation of an engineering program is the implementation of a Continual Improvement (CI) process. FEAS has developed a comprehensive CI process that it utilizes for all of its engineering programs to ensure that students are meeting the learning outcomes. FEAS's CI process is summarized in the following flowchart:



The Engineering Course Information System (ECIS) is a key component that allows the implementation of the CI process. ECIS stores all approved course outlines, course dossiers, and Graduate Attribute (GA) data.

In addition to feedback gathered through the CI process, an exit survey of graduating students is conducted yearly along with surveys of co-op employers. The Civil

Engineering program will also have an Industrial Advisory Committee (IAC) that will provide feedback on the program.

Students at Ontario Tech and the Faculty of Engineering and Applied Science are also provided with a detailed course outline at the start of each semester. This course outline clearly indicates the learning objectives and the topics covered in the course. Additionally, information about the teaching approach, assessment methods, expectations, and all other relevant operational and academic matters are outlined in this document. Students regularly receive grades and feedback throughout the semester and are encouraged to work with their instructor to improve when needed. Ontario Tech also has an early alert system in place for first year students through its academic advising office. This system tracks the students' progress in the first few weeks of their initial year at the university, and support is offered to students struggling with the courses. While this particular system is in place for 1st year students, the advising office continues to work with students and their instructors throughout their program and when needed to ensure students have access to all available academic and mental health resources.

A data-driven approach to track program success will be undertaken by the program leadership team. This will involve the development of internal processes designed to track/evaluate metrics provided by the Centre for Institutional Quality Enhancement, as well as metrics collected by the program. These processes will deliver periodic reports for monitoring the health of the program. We will also initiate surveys with students, graduates, and other key stakeholders to expand the scope of this data-driven approach.

The following data is collected annually:

- course-level performance data (grades, GPA distribution, progression, and completion rates),
- enrollment and retention figures,
- student demographic data relevant to EDI and access,
- course evaluation summaries,
- instructor reflections on course delivery and curricular effectiveness,
- graduate and employment data.

Any required changes to curriculum, assessment methods, delivery, or administration are implemented as appropriate and feasible. Curricular changes are submitted and documented in accordance with the Ontario Tech IQAP.

To ensure sustained quality, program effectiveness will be assessed and monitored through the cyclical review process, providing actionable insights for continuous improvement. In addition to the external review every eight years, Ontario Tech's Academic Resource Committee (ARC) requires a brief report at program launch and a full report one-year after the launch of a new program. The one-year report will ask the program to review enrollment data, admission averages, and provide an analysis of successes and challenges encountered in the first year. If there are areas of concern and it is deemed necessary, ARC will make recommendations to enhance program effectiveness and student success and may request a subsequent report. If required, the subsequent report will address key curricular and student data (e.g. GPA, retention data, etc.) as well as any outstanding recommendations from the one-year report. Pending ARC's review, further documentation may be required of the program for ongoing monitoring.

9 Calendar Copy and Program Map(s)

- *Provide, as an Appendix using the template provided, a clear and full calendar copy. The template ensures consistency across all programs in the Academic Calendar; New minors, Co-op programs, or other alternatives have additional Calendar entries. Should you be including these items, please contact CIQE for more information and templates*
- *Provide, as an Appendix, a full list of all courses included in the program including course numbers, titles, and descriptions. Please indicate clearly whether the courses are new/existing. Include full new course proposals for new courses, the template for which will be provided by CIQE. Include the most recent course descriptions for existing courses. If you are making changes to the existing courses, also include a course change form. In an Appendix referenced in Section 11 below, you will note which faculty members are expected to teach in the program and who is responsible for developing any new courses.*

Please see Appendix D for proposed calendar copy.

Please see Appendix E for a full list of program courses, new course proposals, course change proposals, course descriptions for existing courses.

Please see Appendix K for the mapping of courses to the program emphases (Sustainability, Resilience, AI applications, Energy)

10 Consultation

- *Describe the expected impact of the new program on the nature and quality of other programs delivered by the home and collaborating Faculty(ies) and any expected impact on programs offered by other Faculties*
- *Outline the process of consultation with the Deans of Faculties that will be implicated or affected by the creation of the proposed program*
- *Provide letters of support for the program from Deans at Ontario Tech and/or from other institutions/partners*
- *Describe any consultation undertaken with regard to the principles of Equity, Diversity, Inclusion, and Decolonization not covered in Section 7 above*

The proposed program in Civil Engineering compliments the existing program offerings in FEAS. Given its uniqueness, it is anticipated that there will be a negligible impact on the enrolment of the other engineering programs already being offered. It is expected that the program will have no impact on the enrolment in programs being offered by other Faculties.

The Civil Engineering program will rely on service courses offered by the Faculty of Science and the Faculty of Social Sciences and Humanities, namely:

- Faculty of Science:
  - CHEM 1800U: Chemistry for Engineers
  - MATH 1010U: Calculus I
  - MATH 1020U: Calculus II
  - MATH 1850U: Linear Algebra for Engineers
  - MATH 2860U: Differential Equations for Engineers
  - PHY 1010U: Physics I
  - PHY 1020U: Physics II
  - STAT 2800U: Statistics and Probability for Engineers

- Faculty of Social Sciences and Humanities:
  - ENGR/SSCI 1050U: Engineering Communications and Technology Impacts
  - Liberal Studies Electives (all engineering students are required to take two Liberal Studies courses)

Both Faculties have been consulted about the expected impact of the new program. With the addition of this program, combined with the current growth across the other engineering programs at Ontario Tech, it could be expected that one additional section of each of the above courses will be required.

11 Resource Requirements

Resource Summary
Provide a brief summary *statement of the funding requirements and the rationale. Please consult with the Provost's Office early regarding any resource implications described in this section.*

A minimum faculty complement of six professors (5 TTT and 1 TF) with a background in Civil Engineering are required to cover the new CIVE courses in the program as well as have sufficient faculty with program specific expertise to meet accreditation requirements.

In addition, with the addition of this new program and growth the existing engineering programs will most likely require additional sections of existing courses. Additional teaching resources, in terms of instructors and TAs, will be required for these additional sections. Similarly, for the service courses offered by the Faculty of Science and the Faculty of Social Science and Humanities, there will be a need to offer an additional section of each of the service courses with a corresponding need for instructors and TAs.

Consultation with the Provost's Office will be undertaken in the planning process to review the financial implications of faculty hiring, space development, and capital equipment investments, and to align the resource plan with institutional priorities and budget frameworks.

The resource requirements outlined in Section 11 have been reviewed by the Academic Resource Committee (ARC): *11 November 2025*
(date of review)

11.1 Human Resource Requirements

Faculty - New and Existing Requirements
Complete, as an Appendix, the table detailing the list of faculty committed to the program and provide, in paragraph form below, the following:

- *Clear evidence that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation, and foster an appropriate intellectual climate*
- *Additional information to demonstrate how supervisory loads are distributed in light of qualifications and appointment status, if not clear from the table*

- *Evidence of the participation of a sufficient number and quality of faculty who will actively participate in the delivery of (teach and/or supervise) the program and achieve the goals of the program and foster the appropriate academic environment, contribute substantively to the program, and commit to student mentoring*
- *Describe the role of any sessional/part-time faculty and any adjunct faculty; provide an approximate percentage used in the delivery of the program and the plans to ensure the sustainability of the program and quality of the student experience*
- *Explain the provision of supervision of any experiential learning opportunities; how will supervisory loads be distributed?*

A detailed Faculty Information table is included in appendix F and includes details on new faculty teaching requirements and coverage of new sections.

Provide the CVs of all faculty who appear in the table of faculty committed to the program. These CVs should form a separate document with a table of contents and should have all CVs in alphabetical order by surname. CVs should be submitted in a consistent format.

Please see Curriculum Vitae for Faculty committed to the Program (for CIQE use only).

Are additional faculty required to be able to offer this program? ☒ Yes ☐No

Please explain, i.e. Why would new faculty not be required? Would this change over time? What year will any faculty hire be required, and are there additional criteria associated with the hiring requirement (e.g. enrolment levels, program growth, University or Faculty priorities)?

To ensure successful program delivery and to meet accreditation requirements, an additional five Tenured and Tenure-Track (TTT) Faculty members and one Teaching Faculty (TF) member will be required starting from the program implementation year in 2028-29. Recruitment for the TTT members to further support course/program delivery is structured as two TTT's for 2028-2029, followed by two TTT's for 2029-2030, and 1 TTT and 1 TF for 2030-2031. For each of the academic years noted, hiring commitments of start-up, moving expenses, and PD funds will be required following our standard recruitment packages. In addition to the TTT hiring commitments, office space (13 m^2), and research space equivalent to 50 m^2 for each TTT will be required for each member as they onboard. Additional research space will be required as external research funding is secured to hire/recruit graduate students/research personnel and acquire research equipment.

In addition, with the addition of this new program and growth in the existing engineering programs, the Faculty will most likely require additional sections of existing courses. Additional teaching resources, in terms of instructors and TAs, will be required for these additional sections. Similarly, for the service courses offered by the Faculty of Science and the Faculty of Social Science and Humanities, there will be a need to offer an additional section of each of the service courses with a corresponding need for instructors and TAs.

Additional Academic and Non-Academic Human Resources

Give details regarding the nature and level of TA support required by the program, the level of administrative (i.e. new program director appointment), and academic advising support, etc. If new staff resources are needed, provide further details below.

The proposed program will require additional Teaching Assistant (TA) support to accommodate the new courses being introduced, as well for the additional sections of existing courses that may be required.

Existing administrative staff and academic advising staff will be used initially for the program. As enrolment patterns emerge, staffing needs will be assessed and addressed through established faculty planning and resource allocation processes. An additional Program Assistant and Academic Advisor may be required in future years to support the growth of FEAS's programs.

To facilitate the delivery of required laboratory components, an Engineering Technician will be onboarded beginning in the 2029-2030 academic year.

Are additional staff required to be able to offer this program? ☒ Yes ☐No

If yes, please outline what year the staff hire(s) will be required and any additional criteria associated with the hiring requirement (e.g. enrolment levels, program growth, University or Faculty priorities):

To support the delivery of the required labs, an Engineering Technician will be required to be onboarded as of 2029-2030.

As noted above, with the continued growth FEAS's engineering programs, combined with this new program, an additional Program Assistant and Academic Advisor may be required in future years, but they will not be required to launch the program.

11.2 Learning Resources

Provide an opening statement to describe the resources to sustain the quality of scholarship and research activities of undergraduate and graduate students, enhance the learning and teaching environment, promote student well-being and resiliency in the learning and teaching environment; refer as noted to the two standard Appendices. Please contact your Subject Librarian as you begin your proposal to request the 'Library statement for new program proposal'.

Ontario Tech University is committed to providing robust resources to ensure the sustained quality of scholarship and research for both undergraduate and graduate students, enhance the learning and teaching environment, and promote student well- being and resiliency within the proposed Bachelor of Engineering (Hons), Civil Engineering program. Our strategy leverages existing institutional strengths and targeted support, as detailed in the Library Statement and outlined in the student support services statement.

Please see Appendix G for a statement from the Library confirming the adequacy of library holdings and support for student learning.

Please see Appendix H for a University statement concerning Learning Resources.

11.3 Information Technology

Provide a summary of evidence that there are adequate information technology resources to sustain the quality of scholarship and research activities of undergraduate and graduate students; address any unique requirements including renovations to existing space, Faculty-specific space/equipment, etc.; are there additional technology requirements specific to being able to successfully launch this program? Refer as noted to the standard Appendix.

Ontario Tech possesses strong existing IT infrastructure, including HPC clusters, software licenses, and network connectivity, to support the new Civil Engineering program. All students are required to have a laptop computer and the University provides the necessary software the students will need during their studies, including engineering specific software packages. Specific packages related to the new CIVE courses will be identified as the program rolls out.

Please see Appendix I for a University statement concerning information technology services.

Supporting information for online and hybrid programs
Where applicable, please provide the following details for online and hybrid programs:

- *Describe the adequacy of the technological platform to be used for online delivery*
- *Describe how the quality of education will be maintained*
- *Describe how the program objectives will be met*
- *Describe how the program learning outcomes will be met*
- *Describe the support services and training for teaching staff that will be made available*
- *Describe the sufficiency and type of supports that will be available to students*
- *How has accessibility been considered?*
- *What strategies have been considered to accommodate students with disabilities?*
- *Have the principles of Universal Design been considered?*
- *Will course content be offered in both written and audible forms (e.g., closed captioning, transcriptions)?*
- *Is course content designed logically and is it easy to follow with limited instruction?*
- *Are assignment expectations clear (i.e., a rubric)?*
- *Have the needs of students with limited or unreliable access to wi-fi been considered (e.g., breaking down pre-recorded lectures into maximum 10-minute videos)?*

N/A

11.4 Space and Infrastructure Requirements

- *Provide evidence that there are adequate resources to sustain the quality of scholarship and research activities of undergraduate and graduate students, including information about laboratory and research space access, where applicable, and office space; address any unique requirements*
- *Highlight the change in the number of faculty, students, administrative staff, etc. as well as information on changes in equipment and activities; renovation of existing space; or whether the current space allocation will accommodate the new program*
- *Are there additional space requirements specific to being able to successfully launch this program?*

Four new undergraduate teaching labs will be required to support the new program: Structural, Concrete Material/Pavement, Geotechnical and Hydraulics. One lab targeted for 2028-29 of approximately 90 m² will be required as the overall projected program enrolment is expected to exceed current lab capacity with shared

courses from other engineering programs. In addition, three teaching labs will be required for program delivery, with two dedicated labs for 2029-30 (150 m² total), and one 90 m² lab in 2030-31.

These labs will be housed in the existing OPG Engineering building. These labs are not reliant on the new building being built. As part of the exercise in designing the new building, existing spaces within the OPG Engineering building are being reconfigured and reallocated, including moving the machine shop, to optimize space utilization and create space for the Civil Engineering labs. The specifics are:

ENG1035 and ERC2054 - Fluid Mechanics and Hydraulics Laboratories:

The existing Fluid Mechanics lab in ERC2054 will be used for some experiments and the Hydraulics Laboratory will be set up in ENG1035.

ENG2030, ENG2035, and ENG1045 - Solid Mechanics, Materials, and Structural Laboratories:

ENG2030 and ENG2035 will be used for light-duty, tabletop structural and material testing equipment. ENG1045 will be configured as a Structural Laboratory for heavy-duty testing.

ENG3050: Geotechnical Laboratory:

ENG3050 will be configured as the Geotechnical Laboratory.

Specifics about the equipment to be purchased for the labs will be determined by the faculty members hired for the program who are subject matter experts. The equipment will be purchased in a phased approach that aligns with program delivery in Years 2-4, with the equipment being purchased the year prior to allow adequate time for installation, commissioning, and lab development.

As noted above, with the additional hiring will require faculty members office space (13 m²) and research space equivalent to 50 m² for each TTT as the faculty members onboard. Additional research space will be required as external research funding is secured to hire/recruit graduate students/research personnel and acquire research equipment.

11.5 Other Resource Implications

- *Note here if this new program may impact enrolment agreements with other institutions/external partners that exist with the Faculty/Provost's office. Indicate if the new program will require changes to any existing agreements with other*

institutions or will require the creation of a new agreement. Please consult with CIQE (ciqe@ontariotechu.ca) regarding any implications to existing or new agreements

- *Are there inter-Faculty teaching implications?*
- *If this is a new joint program with another institution, indicate how the program will be administered and how program reviews will be conducted (refer to the Ontario Tech Institutional Quality Assurance Process Policy for more information)*

The new Civil Engineering program has no impact on enrollment agreements with other institutions/external partners.

As per the other BEng programs at Ontario Tech, FEAS will continue to make use of service courses offered by the Faculty of Science and the Faculty of Social Science and Humanities including liberal studies electives. In addition, the management option is comprised entirely of courses offered by the Faculty of Business and Information Technology.

12 Closing Statements Regarding Program Quality

- *Please summarize the appropriateness of the faculty's collective expertise and how it contributes substantively to the proposed program; use indicators to provide evidence of the quality of the faculty (e.g., qualifications, funding, honours, awards, research, innovation, and scholarly record).*
- *Please summarize how the program and faculty will ensure the intellectual quality of the student experience.*

The proposed Civil Engineering program will strengthen and expand the Faculty's academic expertise by introducing an additional engineering discipline within the University's program offerings. The program will benefit from existing faculty members in teaching common core courses in the first year, in addition to courses from Mechanical Engineering. Furthermore, the program will benefit from two existing specializations in FEAS: Railway Engineering and Artificial Intelligence Specializations. The program will expand Ontario tech strength in railway engineering by including the civil engineering aspects of railways.

The intellectual quality of the student experience will be strengthened through a curriculum structure that progressively integrates theory, analysis, design,

experimentation, and computational applications across all four years of study. Faculty research activities will support this progression by incorporating current methodologies, case studies, and applied research problems into coursework, laboratory experiences, and project-based learning.

Appendices

Please include at minimum the below. Additional Appendices may be added, as appropriate. Appendices should ultimately be listed below, attached as separate documents, and clearly labelled (A, B, C, etc.) in the order in which they are first mentioned in the document.

Appendix A - List of Comparator Programs

Appendix B - Program Learning Outcome Alignment Map to DLEs, Courses, and Assessment

Appendix C - Accreditation Table

Appendix D - Calendar Copy with Program Maps

Appendix E - List of Program Courses, New Course Proposals, Course Change Proposals, Course Descriptions for Existing Courses

Appendix F - Faculty Information

Appendix G - Library Report

Appendix H - Learning Resources

Appendix I - Information Technology Resources

Appendix J – Feedback from Stakeholders

Appendix K - Course Intended Learning Outcomes (ILOs) mapped to the proposed program emphases

For CIQE use only
Curriculum Vitae (for Quality Council use only)

Appendix A: Comparator Programs

Please list at least 3 Ontario Tech and 3 external comparators; provide a short summary of the programs and highlight any differences between the degree programs and what is proposed. Please be brief but specific in the table. Avoid value-based statements; rather, focus on need and demand, describing how the proposed program is similar to or different from existing programs.

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
University of Toronto	BASc in Civil Engineering http://civmin.utoronto.ca/home/programs/undergraduate-programs/basc-in-civil engineering/	As per the University of Toronto website: The Faculty of Applied Science and Engineering offers a four-year Bachelor of Applied Science (BASc) in Civil Engineering. Students may choose to participate in the paid Professional Experience Year co-op program allowing them to complete the program after five years. The program has several areas of focus, including Building Science, Construction Management, Environmental Engineering, Mining &	The existing program at the University of Toronto focuses on traditional subdisciplines such as Structural, Environmental, and Transportation Engineering, and it does not offer a specialized pathway for infrastructure engineering. The proposed program differs from the UofT program in the implementation of an innovative curriculum centralized on integrated infrastructure planning, design, and management. This is achieved by combining core civil engineering courses with

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
		Geomechanics, Structural Engineering, and Transportation Engineering & Planning.	artificial intelligence and machine learning courses, and by introducing specialized courses in highway design, modern railway engineering, and intelligent transportation systems.
Western University	BESc in Civil Engineering https://www.eng.uwo.ca/undergraduate/programs/civil.html	As per Western University website: After completing Western Engineering's Common First Year, you can enroll in the Civil Engineering program. In your third year of study, you will have the opportunity to choose one of the following options: Structural Engineering, Environmental Engineering, or International Development with Structural or Environmental Engineering. Structural Engineering Option In our established Structural Engineering option, students take courses in areas such as Structural	Although the proposed program includes fundamental courses similar to those Western University's curriculum, it differs in its overall structure and academic focus, as the proposed curriculum is organized to offer a dedicated specialization in Infrastructure Engineering. In addition, the program introduces new courses in highway design and railway engineering that are not currently offered at Western University. These courses strengthen the technical depth of the curriculum and enrich the distinctiveness of the proposed program.

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
		Theory and Design, Reinforced and Prestressed Concrete Design, Steel Design, Structural Dynamics, Finite Element Design and Tall Buildings, Soil Mechanics, Business, Engineering Ethics, Sustainable Development and Law. Civil Engineering and Artificial Intelligence Systems Engineering, Smart Cities and Structural Engineering Option Western's Artificial Intelligence Systems Engineering (AISE) program is a five-year concurrent degree program that will train today's engineers in the required modern tools to meet increasing employment demands and maximize opportunities for graduates. Artificial Intelligence is swiftly becoming an indispensable tool in the structural engineering	

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
		toolkit, with its applications ranging from design optimization to structural health monitoring (SHM), structural safety, structural design and analysis.	
Toronto Metropolitan University	BEng in Civil Engineering https://www.torontomu.ca/programs/undergraduate/civil-engineering/	As per Toronto Metropolitan University website: The curriculum provides for a general four-year Civil Engineering program. After completing two years in the Civil Engineering program students may continue in the regular Civil Engineering program or choose the Structural Engineering option. The Civil Engineering program curriculum focuses mainly on four areas: environmental, geomatics, structural/materials and transportation engineering. The courses include environmental sustainable development, impact of civil engineering, water and	The existing program at Toronto Metropolitan University focuses mainly on four areas: environmental, geomatics, structural/materials and transportation engineering, and it does not offer a specialized pathway for infrastructure engineering. The proposed program differs from the TMU program in the implementation of an innovative curriculum centralized on integrated infrastructure planning, design, and management. This is achieved by combining core civil engineering courses with artificial intelligence and machine learning courses, and by introducing

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
		wastewater management, soil mechanics, geomatics measurement, remote sensing and digital mapping, satellite navigation, structural analysis and design, concrete and highway materials, highway design, transportation planning, road safety, traffic and transit operation, pavement design and project management.	specialized courses in highway design, modern railway engineering, and intelligent transportation systems.
York University	BEng in Civil Engineering https://lassonde.yorku.ca/academics/civil-engineering	As per York University website: Civil Engineering students at Lassonde learn about structural and foundation design, transportation systems planning and design, water resources management, wastewater treatment, and environmental impact assessment. In addition, our graduates receive training in new emerging areas, such as innovative materials and	The existing program at York University focuses on fundamental engineering courses while offering technical elective courses in structural, geotechnical, environmental, hydrotechnical, and transportation engineering, in addition to building science. The proposed program differs from the York program in the implementation of an innovative curriculum centralized on

Institution and Unit	Degree and Program (including URL)	Program Description and Curriculum	Differences Between This Program and What is Proposed
		construction technologies, infrastructure rehabilitation, computer-aided simulations, sustainability, natural hazards, and climate-change-driven engineering.	integrated infrastructure planning, design, and management. This is achieved by combining core civil engineering courses with artificial intelligence and machine learning courses, and by introducing specialized courses in highway design, modern railway engineering, and intelligent transportation systems.

BEng in Civil Engineering

PLO #	Program Learning Outcomes
1	Apply knowledge of mathematics, physics, chemistry, engineering science, and engineering principles to identify, formulate, analyze, and solve civil engineering problems.
2	Apply the engineering design process to develop and evaluate solutions to civil engineering design problems.
3	Select and use computer-aided engineering software tools and contemporary technologies to solve civil engineering problems and to acquire, analyze, and process data.
4	Work independently and as a member of multi- disciplinary and multi-cultural teams, in a variety of engineering and project environments.
5	Communicate effectively in written, spoken, and visual form with both technical experts and with members of the general public on engineering matters
6	Recognize and value the alternative outlooks that people from various social, ethnic, and religious backgrounds, as well as professions, may bring to civil engineering.
7	Evaluate emerging technologies and recognize the importance of lifelong learning in supporting continued professional development.

BEng in Civil Engineering

	Degree Level Expectation	Depth and Breadth of Knowledge			Knowledge of Methodologies		Application of Knowledge			Communication Skills		Awareness of Limits of Knowledge	Autonomy and Professional Capacity		
	Program Learning Outcomes	LO1	LO2	LO3	LO2	LO3	LO2	LO3	LO4	L04	L05	LO6	LO4	LO6	LO7
Course No.	**Course Title**														
ENGR 1015U	Introduction to Engineering		1,2,4	1,2	1,2,4	1,2,4	1,2,4					1,2,4		1,2,4	1,2,4
ENGR 1050U	Engineering Communications & Technology Impacts									1,4,5	1,4,5	1,2,4,5	1,4,5	1,4,5	1,4,5
MATH 1010U	Calculus I	1.2					1,2,4								
MATH 1850U	Linear Algebra for Engineers	2					2								
PHY 1010U	Physics I	1,2					1,2,4								
CHEM 1800U	Chemistry for Engineers	1,2,4					1,2,4					1,2,4			1,2,4
ENGR 1200U	Intro to Programming for Engineers	1,2,4	1,2	1,2,4	1,2,4	1,4	2,4								1,2,4
MATH 1020U	Calculus II	1,4					1,2,4								
PHY 1020U	Physics II	1,2,4					1,2,4								
ENGR 1025U	Engineering Design	1,2,3,5	1,2,3,5	1,2,3,5	1,2,4	1,2	1,2,3,5		1,2,4	1,2,3,5		1,2	1,2,4		1,2,4
CIVE 2100U	Geology for Engineers	1,2,4	2,4		2,4		2,4	1,2,4				1,2,4			
MANE 2220U	Structure and Properties of Materials	2,4													1,2,4
MATH 2860U	Differential Equations	1,2					1,4								
MECE 2230U	Statics	1,2,4					1,2,4			2,4			1,4		
ENGR 2100U	Computational Engineering Applications	1,2,4		1,2,4		2,4	1,2,4				1,2,4,5				1,2,4
CIVE 2200U	Structural Analysis	1,4					1,4							2,4	
CIVE 2300U	Surverying	1,2,5		1,2,5		1,2,5				5	1,2,4,5		5		
MECE 2420U	Solid Mechanics I	1,2,4					1,2,4								
MECE 2860U	Fluid Mechanics	1,2,4					2,4								
STAT 2800U	Stats for Engs	1,2,4	1,2,4		1,2,4		1,2,4	1,2,4							
CIVE 3100U	Soil Mechanics and Hydrogeologic Engineering	1,4		1,2,4		1,2,4	1,2,4			1,2,4			2,4		
CIVE 3200U	Indeterminate Structures and Steel Design		1,2,4		1,2,4		1,2,4								
CIVE 3300U	Materials and Sensor Technologies	1,2										1,2,4			
CIVE 3400U	Principles of Transportation Engineering	1,2,4	1,2,4		1,2,4		1,4	1,2,4				1,2,4			
ENGR 3150U	Artificial Intelligence and Machine Learning	1,2,4	1.4		2,4		2,4	1,2,4							1,2,4
CIVE 3500U	Construction Management		1,2,4,5		1,2,4,5		1,2,4,5	1,2,4,5	1,2,4,5	1,2,4,5	1,2,4,5		1,2,4,5	1,2,4,5	1,2,4,5
CIVE 3600U	Introduction to Geotechnical Engineering	1,2,4					1,2,4								
CIVE 3700U	Infracstructure Systems and Sustainability	1,2	1,2,4		1,2,4		1,2,4					1,4			
CIVE 3800U	Municipal Engineering Design	1,2,4	1,4		1,2		1,2,4					1,2			
CIVE 3900U	Reinforced Concrete Design		1,2,4		1,2,4		1,2,4								
ENGR 3360U	Engineering Economics						1,2,4,5		1,2,4,5			1,2,4			1,2,4
CIVE 4100U	Geotechnical Design	1,2,4	1,2,4		1,2,4		1,2,4								
CIVE 4200U	Intelligent Transportation Systems						1,2,4	1,2,4				1,2,4,5		2,4	
CIVE 4300U	Highway Design		2,4		1,2,4		1,2,4								
CIVE 4400U	Railway Track Design	1,4	1,2		1,4		1,4								
ENGR 4111U	Capstone Systems Design I	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,5		3,4,5	3,4,5	3,4,5
ENGR 4222U	Capstone Systems Design II	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5	3,4,5		3,4,5	3,5	3,4,5	3,4,5	3,4,5	
ENGR 4760U	Ethics, Law, Prof for Engs											1,2,4	1,2,4	1,2,4	1,2,4

Degee of Implementation:	**Assessments - Identify types of relevant assessments and number them (do not have to be in rank order); those listed below are only examples**	
Introduced	1 - Test	4 - Assignment
Reinforced	2 - Exam	5 - Project Report
Mastered	3 - Presentation	

Appendix C - Accreditation Table

Civil Engineering

	Course Code	Course Name	MC	LEC	Lab/Tut	LEC-Aus	LAB-Aus	S=Lec+0.5	Math%	NS %	CS %	ES%	ED %	Math au	NS au	CS au	ES au	ED au	ES + ED a	Math+NS	KBE	PA	INV	DES	UET	ITW	COM	PRO	ISE	ETH	EPM	LLL
Year 1	ENGR 1015U	Introduction to Engineering	3	3	2.5	36	30	51	0	0	30	45	25	0	0	15.3	22.95	12.75	35.7	0				I	I			I	I	I		I
	ENGR 1050U	Engineering Communications & Technology Impacts	3	3	1	36	12	42	0	0	100	0	0	0	0	42	0	0	0	0							I	I	I	I		I
	MATH 1010U	Calculus I	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	I	I										
	MATH 1850U	Linear Algebra for Engineers	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	I	I										
	PHY 1010U	Physics I	3	3	2.25	36	27	49.5	0	100	0	0	0	0	49.5	0	0	0	0	49.5	I	I										
	CHEM 1800U	Chemistry for Engineers	3	3	1.75	36	21	46.5	0	100	0	0	0	0	46.5	0	0	0	0	46.5	I	I							I			I
	ENGR 1200U	Intro to Programming for Engineers	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	I		I		I							I
	MATH 1020U	Calculus II	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	D	D										
	PHY 1020U	Physics II	3	3	2.25	36	27	49.5	0	100	0	0	0	0	49.5	0	0	0	0	49.5	D	D										
	ENGR 1025U	Engineering Design	3	3	3	36	36	54	0	0	0	0	100	0	0	0	0	54	54	0			I	I	I	I			I		I	I
Year 2	CIVE 2100U	Geology for Engineers	3	**3**	**1**	36	12	42	0	**25**	0	**75**	**0**	0	10.5	0	31.5	0	31.5	10.5	**D**	**D**							**D**			
	MANE 2220U	Structure and Properties of Materials	3	3	2	36	24	48	0	75	0	25	0	0	36	0	12	0	12	36	I	D										I
	MATH 2860U	Differential Equations	3	3	1	36	12	42	100	0	0	0	0	42	0	0	0	0	0	42	D	D										
	MECE 2230U	Statics	3	3	1	36	12	42	0	25	0	75	0	0	10.5	0	31.5	0	31.5	10.5	I	D										
	ENGR 2100U	Computational Engineering Applications	3	3	3	36	36	54	50	0	0	50	0	27	0	0	27	0	27	27		D	D		D	D	D					I
	CIVE 2200U	Structural Analysis	3	**3**	**3**	36	36	54	0	0	0	**100**	0	0	0	0	54	0	54	0	**D**	**D**	**D**					**D**				
	CIVE 2300U	Surverying	3	**2**	**4**	24	48	48	0	0	0	**100**	0	0	0	0	48	0	48	0			**D**		**D**	**D**	**D**					
	MECE 2420U	Solid Mechanics I	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	D	D			I							
	MECE 2860U	Fluid Mechanics	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	D	D	D		I							
	STAT 2800U	Stats for Engs	3	3	0	36	0	36	100	0	0	0	0	36	0	0	0	0	0	36	D	D										
	LSE	Liberal Studies Elective	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0												
Year 3	CIVE 3100U	Soil Mechanics and Hydrogeologic Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0		**D**	**D**			**D**						
	CIVE 3200U	Indeterminate Structures and Steel Design	3	**3**	**1**	36	12	42	0	0	0	**75**	**25**	0	0	0	31.5	10.5	42	0		**D**		**D**	**D**				**D**			
	CIVE 3300U	Materials and Sensor Technologies	3	**3**	**3**	36	36	54	0	0	0	**100**	0	0	0	0	54	0	54	0	**D**				**D**					**D**			
	CIVE 3400U	Principles of Transportation Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0	**D**	**D**			**D**					**D**			
	ENGR 3150U	Artificial Intelligence and Machine Learning	3	3	1	36	12	42	0	0	0	75	25	0	0	0	31.5	10.5	42	0		D	D	D	D								I
	CIVE 3500U	Construction Management	3	**3**	**1**	36	12	42	0	0	**20**	**80**	0	0	0	8.4	33.6	0	33.6	0							**D**	**D**		**D**	**D**	**D**
	CIVE 3600U	Introduction to Geotechnical Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0		**D**	**D**						**D**			
	CIVE 3700U	Infrastructure Systems and Sustainability	3	**3**	**2**	36	24	48	0	0	0	**75**	**25**	0	0	0	36	12	48	0		**D**		**D**								
	CIVE 3800U	Municipal Engineering Design	3	**3**	**1**	36	12	42	0	0	0	**75**	**25**	0	0	0	31.5	10.5	42	0			**D**	**D**	**D**				**D**			
	CIVE 3900U	Reinforced Concrete Design	3	**3**	**2**	36	24	48	0	0	0	**75**	**25**	0	0	0	36	12	48	0		**D**		**D**								
	ENGR 3360U	Engineering Economics	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0		A									D	A
Year 4	LSE	Liberal Studies Elective	3	3	0	36	0	36	0	0	100	**0**	**0**	0	0	36	0	0	0	0												
	CIVE 4100U	Geotechnical Design	3	**3**	**1**	36	12	42	0	0	0	**60**	**40**	0	0	0	25.2	16.8	42	0	**A**		**A**	**A**								
	CIVE 4200U	Intelligent Transportation Systems	3	**3**	**0**	36	0	36	0	0	0	**100**	0	0	0	0	36	0	36	0		**A**			**A**				**A**	**A**		
	CIVE 4300U	Highway Design	3	**3**	**0**	36	0	36	0	0	0	**60**	**40**	0	0	0	21.6	14.4	36	0		**A**		**A**					**A**			
	CIVE 4400U	Railway Track Design	3	**3**	**0**	36	0	36	0	0	0	**60**	**40**	0	0	0	21.6	14.4	36	0	**A**		**A**	**A**	**A**				**A**			
	ENGR 4111U	Capstone Systems Design I	0	1.5	3	18	36	43.5	0	0	25	0	75	0	0	10.875	0	32.625	32.625	0				A		A	A	A			A	A
	ENGR 4222U	Capstone Systems Design II	0	1.5	3	18	36	43.5	0	0	25	0	75	0	0	10.875	0	32.625	32.625	0			A	A		A	A		A	A		
	ENGR 4760U	Ethics, Law, Prof for Engs	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0							A	A	A	A		A
	ENG Elective	See Below	3	3	0	36	0	36						0	0	0	18	0	21.6	0												
	ENG Elective	See Below	3	3	0	36	0	36						0	0	0	27	0	36	0												
	ENG Elective	See Below	3	3	0	36	0	36						0	0	0	27	0	36	0												
ENG Electives	ENGR 4570U	Indigenous Design and Technology		3	0	36	0	36	0	0	40	50	10			14.4	18	3.6	21.6	0	A											
	CIVE 4000U	Special Topics in Civil Engineering	0	**3**	0	36	0	36	0	0	0	**100**	**0**	0	0	0	36	0	36	0	**A**											
	CIVE 4500U	Digital Water Infrastructure	0	**3**	**0**	36	0	36	0	0	0	**100**	**0**	0	0	0	36	0	36	0	**A**	**A**										
	CIVE 4600U	Environmental Design of Waste Disposal	0	**3**	**0**	36	0	36	0	0	0	**75**	**25**	0	0	0	27	9	36	0	**A**			**A**								
	CIVE 4700U	Data Science in Geotechnical Engineering	0	**3**	**0**	36	0	36	0	0	0	**100**	**0**	0	0	0	36	0	36	0	**A**		**A**									
	CIVE 4800U	Hydrology	0	**3**	**1**	36	12	42	0	0	0	**100**	**0**	0	0	0	42	0	42	0	**A**		**A**						**A**			
	CIVE 4850U	Environmental Hydraulics Design	0	**3**	**2**	36	24	48	0	0	0	**75**	**25**	0	0	0	36	12	48	0		**D**	**D**	**D**					**D**			
	CIVE 4900U	Building Sustainability	0	**3**	**0**	36	0	36	0	0	0	**75**	**25**	0	0	0	27	9	36	0	**A**	**A**		**A**	**A**				**A**			
	CIVE 4950U	Digital Project Delivery	0	**3**	**0**	36	0	36	0	0	0	**100**	**0**	0	0	0	36	0	36	0	**A**	**A**			**A**							

	MATH	240											Current AU	240	202.5	231.45	927.45	233.1	1182.15	442.5												
	NS MC	202.5											CEAB Min Required	195	195	225	225	225	900	420												
	CS MC	231.45																														
	ES MC	927.45																														
	ED MC	233.1																														
	MC TOTALS	1834.5																														
	K FACTOR	14.5																														
	Total AU Without ENG Electives	1762.5																														
	Total AU	1870.5																														

Civil Engineering – Railway Engineering Specialization

	Course Code	Course Name	MC	LEC	Lab/Tut	LEC-Aus	LAB-Aus	S=Lec+0.5	Math%	NS %	CS %	ES%	ED %	Math au	NS au	CS au	ES au	ED au	ES + ED a	Math+NS	KBE	PA	INV	DES	UET	ITW	COM	PRO	ISE	ETH	EPM	LLL
Year 1	ENGR 1015U	Introduction to Engineering	3	3	2.5	36	30	51	0	0	30	45	25	0	0	15.3	22.95	12.75	35.7	0				I	I			I	I	I		I
	ENGR 1050U	Engineering Communications & Technology Impacts	3	3	1	36	12	42	0	0	100	0	0	0	0	42	0	0	0	0							I	I	I	I		I
	MATH 1010U	Calculus I	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	I	I										
	MATH 1850U	Linear Algebra for Engineers	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	I	I										
	PHY 1010U	Physics I	3	3	2.25	36	27	49.5	0	100	0	0	0	0	49.5	0	0	0	0	49.5	I	I										
	CHEM 1800U	Chemistry for Engineers	3	3	1.75	36	21	46.5	0	100	0	0	0	0	46.5	0	0	0	0	46.5	I	I							I			I
	ENGR 1200U	Intro to Programming for Engineers	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	I		I		I							I
	MATH 1020U	Calculus II	3	3	1.5	36	18	45	100	0	0	0	0	45	0	0	0	0	0	45	D	D										
	PHY 1020U	Physics II	3	3	2.25	36	27	49.5	0	100	0	0	0	0	49.5	0	0	0	0	49.5	D	D										
	ENGR 1025U	Engineering Design	3	3	3	36	36	54	0	0	0	0	100	0	0	0	0	54	54	0			I	I	I	I			I		I	I
Year 2	CIVE 2100U	Geology for Engineers	3	**3**	**1**	36	12	42	0	**25**		**75**	**0**	0	10.5	0	31.5	0	31.5	10.5	**D**	**D**							**D**			
	MANE 2220U	Structure and Properties of Materials	3	3	2	36	24	48	0	75	0	25	0	0	36	0	12	0	12	36	I	D										I
	MATH 2860U	Differential Equations	3	3	1	36	12	42	100	0	0	0	0	42	0	0	0	0	0	42	D	D										
	MECE 2230U	Statics	3	3	1	36	12	42	0	25	0	75	0	0	10.5	0	31.5	0	31.5	10.5	I	D										
	ENGR 2100U	Computational Engineering Applications	3	3	3	36	36	54	50	0	0	50	0	27	0	0	27	0	27	27		D	D		D	D	D					
	CIVE 2200U	Structural Analysis	3	**3**	**3**	36	36	54	0	0	0	**100**	0	0	0	0	54	0	54	0	**D**	**D**	**D**					**D**				
	CIVE 2300U	Surverying	3	**2**	**4**	24	48	48	0	0	0	**100**	0	0	0	0	48	0	48	0			**D**		**D**	**D**	**D**					
	MECE 2420U	Solid Mechanics I	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	D	D			I							
	MECE 2860U	Fluid Mechanics	3	3	2	36	24	48	0	0	0	100	0	0	0	0	48	0	48	0	D	D	D		I							
	STAT 2800U	Stats for Engs	3	3	0	36	0	36	100	0	0	0	0	36	0	0	0	0	0	36	D	D										
	LSE	Liberal Studies Elective	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0												
Year 3	CIVE 3100U	Soil Mechanics and Hydrogeologic Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0		**D**	**D**			**D**						
	CIVE 3200U	Indeterminate Structures and Steel Design	3	**3**	**1**	36	12	42	0	0	0	**75**	**25**	0	0	0	31.5	10.5	42	0		**D**		**D**	**D**							
	CIVE 3300U	Materials and Sensor Technologies	3	**3**	**3**	36	36	54	0	0	0	**100**	0	0	0	0	54	0	54	0	**D**				**D**				**D**			
	CIVE 3400U	Principles of Transportation Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0	**D**	**D**			**D**				**D**			
	ENGR 3011U	Introduction to Railway Systems	3	3	1	**36**	**12**	**42**	0	0	0	100	0	0	0	0	42	0	42	0	D	D						D				
	ENGR 3150U	Artificial Intelligence and Machine Learning	3	3	1	36	12	42	0	0	0	75	25	0	0	0	31.5	10.5	42	0		D	D	D	D							I
	CIVE 3500U	Construction Management	3	**3**	**1**	36	12	42	0	0	**20**	**80**	0	0	0	8.4	33.6	0	33.6	0							**D**	**D**		**D**	**D**	**D**
	CIVE 3600U	Introduction to Geotechnical Engineering	3	**3**	**1**	36	12	42	0	0	0	**100**	0	0	0	0	42	0	42	0		**D**	**D**									
	CIVE 3700U	Infrastructure Systems and Sustainability	3	**3**	**2**	36	24	48	0	0	0	**75**	**25**	0	0	0	36	12	48	0		**D**		**D**								
	CIVE 3800U	Municipal Engineering Design	3	**3**	**1**	36	12	42	0	0	0	**75**	**25**	0	0	0	31.5	10.5	42	0			**D**	**D**	**D**				**D**			
	CIVE 3900U	Reinforced Concrete Design	3	**3**	**2**	36	24	48	0	0	0	**75**	**25**	0	0	0	36	12	48	0		**D**		**D**								
	ENGR 3360U	Engineering Economics	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0		A									D	A
Year 4	LSE	Liberal Studies Elective	3	3	0	36	0	36	0	0	100	**0**	**0**	0	0	36	0	0	0	0												
	ENGR 4022U	Railway Safety and Signalling	3	3	1	36	12	42	0	0	0	100	0	0	0	0	42	0	42	0	A								A			
	CIVE 4100U	Geotechnical Design	3	**3**	**1**	36	12	42	0	0	0	**60**	**40**	0	0	0	25.2	16.8	42	0	**A**		**A**	**A**								
	CIVE 4200U	Intelligent Transportation Systems	3	**3**	**0**	36	0	36	0	0	0	**100**	0	0	0	0	36	0	36	0		**A**			**A**				**A**	**A**		
	CIVE 4400U	Railway Track Design	3	**3**	**0**	36	0	36	0	0	0	**60**	**40**	0	0	0	21.6	14.4	36	0	**A**		**A**	**A**	**A**				**A**			
	ENGR 4033U	Railway Rolling Stock	3	3	1	36	12	42	0	0	0	80	20	0	0	0	33.6	8.4	42	0	A		A	A								
	ENGR 4044U	Railway Systems Operation and Maintenance	3	3	1	36	12	42	0	0	0	100	0	0	0	0	42	0	42	0	A	A									A	
	ENGR 4111U	Capstone Systems Design I	0	1.5	3	18	36	44.08537	0	0	25	0	75	0	0	11.02134	0	33.06402	33.06402	0				A		A	A	A			A	A
	ENGR 4222U	Capstone Systems Design II	0	1.5	3	18	36	44.08537	0	0	25	0	75	0	0	11.02134	0	33.06402	33.06402	0			A	A		A	A		A	A		
	ENGR 4760U	Ethics, Law, Prof for Engs	3	3	0	36	0	36	0	0	100	0	0	0	0	36	0	0	0	0							A	A	A	A		A

MATH	240	Current AU	240	202.5	231.7427	993.45	227.978	1221.428	442.5
NS MC	202.5	CEAB Min Required	195	195	225	225	225	900	420
CS MC	231.7426829								
ES MC	993.45								
ED MC	227.9780488								
MC TOTALS	1895.670732								
K FACTOR	14.69512195								
Total AU Without ENG Electives	1895.670732								
Total AU	1895.670732								

Appendix D - Calendar Copy with Program Map

Calendar Copy

Civil Engineering

General information

Civil Engineering program will focus on Infrastructure Engineering that will train the students for planning, design, analysis, construction, operation, and resilience of large-scale public systems that support society and economic activities. The program aims to prepare graduates with the knowledge and skills required to design and assess sustainable and resilient infrastructure, including structural, transportation, geotechnical, environmental, and municipal systems. The proposed civil engineering program provides students with a comprehensive foundation in civil infrastructure systems while integrating artificial intelligence applications with engineering fundamentals. Through specialized courses and project-based learning, the program prepares graduates to develop and implement intelligent systems that enhance infrastructure resilience, efficiency, and sustainability while addressing emerging technological challenges in the built environment.

Admission requirements

Admission requirements should include the general University statement:

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum average of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), and Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required, with no grade below 60 per cent. All other applicants should refer to admissions for the requirements for their specific category of admission.

Note: students who are missing one or more of Calculus and Vectors (MCV4U), Chemistry (SCH4U), and/or Physics (SPH4U), may apply for admission to the pre-engineering program.

Professional designation

Our undergraduate engineering programs in the Faculty of Engineering and Applied Science have been fully accredited by the Canadian Engineering Accreditation Board. Each graduate is eligible to apply for licensing as a professional engineer (PEng) in any province or territory in Canada. Note that our newest programs, Energy Engineering and Industrial Engineering, will go for accreditation in 2026-2027 when the first classes of students reach fourth year.

Program details and degree requirements

To be eligible for an honours Bachelor of Engineering degree in Civil Engineering, students must successfully complete 129 credit hours, including all courses outlined here. For elective options, see the following list.

All courses in Year 1 are prerequisites to all non-elective courses in Year 3.

All courses in Years 1 and 2 are prerequisites to all non-elective courses in Year 4.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at engineering.ontariotechu.ca.

Year 1 (30 credit hours)

- ENGR 1015U Introduction to Engineering
- ENGR 1050U Engineering Communications and Technology Impacts
- MATH 1010U Calculus I
- MATH 1850U Linear Algebra for Engineers
- PHY 1010U Physics I
- CHEM 1800U Chemistry for Engineers
- ENGR 1025U Engineering Design
- ENGR 1200U Introduction to Programming for Engineers
- MATH 1020U Calculus II
- PHY 1020U Physics II

Year 2 (33 credit hours)

- CIVE 2100U Geology for Engineers
- MANE 2220U Structure and Properties of Materials
- MATH 2860U Differential Equations for Engineers
- MECE 2230U Statics

- CIVE 2200U Structural Analysis
- ENGR 2100U Computational Engineering Applications
- MECE 2420U Solid Mechanics I
- MECE 2860U Fluid Mechanics
- STAT 2800U Statistics and Probability for Engineers
- CIVE 2300U Surveying
- Liberal Studies Elective*

Year 3 (33 credit hours)

- CIVE 3100U Soil Mechanics and Hydrogeologic Engineering
- CIVE 3200U Indeterminate Structures and Steel Design
- CIVE 3300U Materials and Sensor Technologies
- CIVE 3400U Principles of Transportation Engineering
- ENGR 3150U Artificial Intelligence and Machine Learning
- CIVE 3500U Construction Management
- CIVE 3600U Introduction to Geotechnical Engineering
- CIVE 3700U Infrastructure Systems and Sustainability
- CIVE 3800U Municipal Engineering Design
- CIVE 3900U Reinforced Concrete Design
- ENGR 3360U Engineering Economics

Year 4 (33 credit hours)

- Engineering - Elective*
- ENGR 4111U - Capstone Systems Design I
- ENGR 4760U - Ethics, Law and Professionalism for Engineers
- CIVE 4100U Geotechnical Design
- CIVE 4200U Intelligent Transportation Systems
- CIVE 4300U Highway Design
- CIVE 4400U Railway Track Design
- ENGR 4222U Capstone Systems Design II
- Engineering Elective*
- Engineering Elective*
- Liberal Studies Elective*

Engineering electives

Courses selected for the engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the

prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field. Not all of the listed engineering electives will necessarily be offered each year.

The following are approved courses as engineering electives:

- ENGR 4570U Indigenous Design and Technology
- CIVE 4000U Special Topics in Civil Engineering
- CIVE 4500U Digital Water Infrastructure
- CIVE 4600U Environmental Design of Waste Disposal
- CIVE 4700U Data Science in Geotechnical Engineering
- CIVE 4800U Hydrology
- CIVE 4850U Environmental Hydraulics Design
- CIVE 4900U Building Sustainability
- CIVE 4950U Digital Project Delivery

Liberal Studies electives

Complementary studies, including courses in humanities, social sciences, arts, management, engineering economics, ethics and communication, are included in engineering programs to complement the technical content of the curriculum and thereby provide graduates with a broader perspective of their role in society. The inclusion of complementary studies also satisfies several accreditation criteria of the Canadian Engineering Accreditation Board. Courses or parts of courses covering engineering economics, ethics, and the impact of technology on society, as well as courses that develop the student's capability to communicate orally, visually and in writing, are essential to the education of an engineer and therefore are included in all of our engineering programs.

Liberal studies electives are included in each engineering program to ensure adequate coverage of subject matter that deals with central issues, methodologies and thought processes of the humanities and social sciences. Such material is required in the education of an engineer. Liberal studies electives can include, but are not limited to, courses dealing with cultural analysis; historical analysis; literature and the arts; knowledge, cognition, and moral reasoning; and social and behavioural analysis.

Foreign language and business courses may not be used as liberal studies electives. Courses can be approved as liberal studies electives for students in engineering programs at the university by the Dean of the Faculty of Engineering and Applied Science (or designate), in accordance with these principles.

Courses selected for the liberal studies electives must be approved by the Faculty of Engineering and Applied Science. Liberal studies electives are subject to change. An updated list of liberal studies electives will be maintained online at engineering.ontariotechu.ca.

Civil Engineering Program						
Year	**Course**	**Course**	**Course**	**Course**	**Course**	**Course**
1-1	ENGR 1015U Introduction to Engineering	ENGR 1050U Engineering Communications and Technology Impacts	MATH 1010U Calculus I	MATH 1850U Linear Algebra for Engineers	PHY 1010U Physics I	
1-2	CHEM 1800U Chemistry for Engineers	ENGR 1025U Engineering Design (ENGR 1015U, ENGR 1050U)	ENGR 1200U Introduction to Programming for Engineers	MATH 1020U Calculus II (MATH 1010U)	PHY 1020U Physics II (PHY 1010U)	
2-1	CIVE 2100U Geology for Engineers	MANE 2220U Structure and Properties of Materials (CHEM 1800U)	MATH 2860U Differential Equations for Engineers (MATH 1020U, Coreq: MATH 1850U)	MECE 2230U Statics (MATH 1020U, PHY 1010U)	Liberal Studies Elective	
2-2	CIVE 2200U Structural Analysis (MECE 2230U, MATH 2860U)	ENGR 2100U Computational Engineering Applications (ENGR 1200U, MATH 1850U, MATH 2860U or ELEE 2530U)	MECE 2420U Solid Mechanics I (MECE 2230U)	MECE 2860U Fluid Mechanics (PHY 1010U, MATH 1020U)	STAT 2800U Statistics and Probability for Engineers (MATH 1020U)	
2-3	CIVE 2300U Surveying (ENGR 1025U)					
3-1	CIVE 3100U Soil Mechanics and Hydrogeologic Engineering (CIVE 2100, MECE 2420U, MECE 2860U)	CIVE 3200U Indeterminate Structures and Steel Design (CIVE 2200U, ENGR 1025U)	CIVE 3300U Materials and Sensor Technologies (CIVE 2200U, MECE 2420U)	CIVE 3400U Principles of Transportation Engineering (ENGR 2100U)	ENGR 3150U Artificial Intelligence & Machine Learning (STAT 2800U, (ENGR 2100U or SOFE 2710U))	
3-2	CIVE 3500U Construction Management (CIVE 2300U)	CIVE 3600U Introduction to Geotechnical Engineering (CIVE 3100U)	CIVE 3700U Infrastructure Systems and Sustainability (CIVE 3300)	CIVE 3800U Municipal Engineering Design (MECE 2860U)	CIVE 3900U Reinforced Concrete Design (CIVE 3300U)	ENGR 3360U Engineering Economics
4-1	CIVE 4100U Geotechnical Design (CIVE 3600U)	CIVE 4200U Intelligent Transportation Systems (CIVE 3400U, ENGR 3150U)	ENGR 4111U Capstone Systems Design I (Completion of all program-respective courses in Years 1 through 3)	ENGR 4760U Ethics, Law and Professionalism for Engineers	Engineering Elective	Liberal Studies Elective
4-2	CIVE 4300U Highway Design (CIVE 2100U, CIVE 2300U, CIVE 3400U)	CIVE 4400U Railway Track Design (CIVE 2100U, CIVE 2300U, CIVE 3300U)	ENGR 4222U Capstone Systems Design II (ENGR 4111U)	Engineering Elective	Engineering Elective	

Civil Engineering - Railway Engineering Specialization

General information

Civil Engineering program will focus on Infrastructure Engineering that will train the students for planning, design, analysis, construction, operation, and resilience of large-scale public systems that support society and economic activities. The program aims to prepare graduates with the knowledge and skills required to design and assess sustainable and resilient infrastructure, including structural, transportation, geotechnical, environmental, and municipal systems. The proposed civil engineering program provides students with a comprehensive foundation in civil infrastructure systems while integrating artificial intelligence applications with engineering fundamentals. Through specialized courses and project-based learning, the program prepares graduates to develop and implement intelligent systems that enhance infrastructure resilience, efficiency, and sustainability while addressing emerging technological challenges in the built environment.

The specialization in Railway Engineering is designed to prepare graduates with the knowledge needed to meet the needs of the rapidly growing railway sector. Through four courses, students will learn the key elements of rail systems, including railway operations, safety, signalling, rolling stock, and maintenance.

Admission requirements

Admission requirements should include the general University statement:

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum average of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), and Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required, with no grade below 60 per cent. All other applicants should refer to admissions for the requirements for their specific category of admission.

Note: students who are missing one or more of Calculus and Vectors (MCV4U), Chemistry (SCH4U), and/or Physics (SPH4U), may apply for admission to the pre-engineering program.

Professional designation

Our undergraduate engineering programs in the Faculty of Engineering and Applied Science have been fully accredited by the Canadian Engineering Accreditation Board. Each graduate is eligible to apply for licensing as a professional engineer (PEng) in any province or territory in Canada. Note that our newest programs, Energy Engineering and Industrial Engineering, will go for accreditation in 2026-2027 when the first classes of students reach fourth year.

Program details and degree requirements

To be eligible for an honours Bachelor of Engineering degree in Civil Engineering, students must successfully complete 129 credit hours, including all courses outlined here. For elective options, see the following list.

All courses in Year 1 are prerequisites to all non-elective courses in Year 3.

All courses in Years 1 and 2 are prerequisites to all non-elective courses in Year 4.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at engineering.ontariotechu.ca.

Year 1 (30 credit hours)

- ENGR 1015U Introduction to Engineering
- ENGR 1050U Engineering Communications and Technology Impacts
- MATH 1010U Calculus I
- MATH 1850U Linear Algebra for Engineers
- PHY 1010U Physics I
- CHEM 1800U Chemistry for Engineers
- ENGR 1025U Engineering Design
- ENGR 1200U Introduction to Programming for Engineers
- MATH 1020U Calculus II
- PHY 1020U Physics II

Year 2 (33 credit hours)

- CIVE 2100U Geology for Engineers
- MANE 2220U Structure and Properties of Materials
- MATH 2860U Differential Equations for Engineers
- MECE 2230U Statics
- CIVE 2200U Structural Analysis

- ENGR 2100U Computational Engineering Applications
- MECE 2420U Solid Mechanics I
- MECE 2860U Fluid Mechanics
- STAT 2800U Statistics and Probability for Engineers
- CIVE 2300U Surveying
- Liberal Studies Elective*

Year 3 (36 credit hours)

- CIVE 3100U Soil Mechanics and Hydrogeologic Engineering
- CIVE 3200U Indeterminate Structures and Steel Design
- CIVE 3300U Materials and Sensor Technologies
- CIVE 3400U Principles of Transportation Engineering
- ENGR 3011U Introduction to Railway Systems
- ENGR 3150U Artificial Intelligence and Machine Learning
- CIVE 3500U Construction Management
- CIVE 3600U Introduction to Geotechnical Engineering
- CIVE 3700U Infrastructure Systems and Sustainability
- CIVE 3800U Municipal Engineering Design
- CIVE 3900U Reinforced Concrete Design
- ENGR 3360U Engineering Economics

Year 4 (30 credit hours)

- ENGR 4022U Railway Safety and Signalling
- ENGR 4111U Capstone Systems Design I
- ENGR 4760U Ethics, Law and Professionalism for Engineers
- CIVE 4100U Geotechnical Design
- CIVE 4200U Intelligent Transportation Systems
- ENGR 4033U Railway Rolling Stock
- ENGR 4044U Railway Systems Operation and Maintenance
- CIVE 4400U Railway Track Design
- ENGR 4222U Capstone Systems Design II
- Liberal Studies Elective*

Civil Engineering - Railway Engineering Specialization						
Year	**Course**	**Course**	**Course**	**Course**	**Course**	**Course**
1-1	ENGR 1015U Introduction to Engineering	ENGR 1050U Engineering Communications and Technology Impacts	MATH 1010U Calculus I	MATH 1850U Linear Algebra for Engineers	PHY 1010U Physics I	
1-2	CHEM 1800U Chemistry for Engineers	ENGR 1025U Engineering Design (ENGR 1015U, ENGR 1050U)	ENGR 1200U Introduction to Programming for Engineers	MATH 1020U Calculus II (MATH 1010U)	PHY 1020U Physics II (PHY 1010U)	
2-1	CIVE 2100U Geology for Engineers	MANE 2220U Structure and Properties of Materials (CHEM 1800U)	MATH 2860U Differential Equations for Engineers (MATH 1020U, Coreq: MATH 1850U)	MECE 2230U Statics (MATH 1020U, PHY 1010U)	Liberal Studies Elective	
2-2	CIVE 2200U Structural Analysis (MECE 2230U, MATH 2860U)	ENGR 2100U Computational Engineering Applications (ENGR 1200U, MATH 1850U, MATH 2860U or ELEE 2530U)	MECE 2420U Solid Mechanics I (MECE 2230U)	MECE 2860U Fluid Mechanics (PHY 1010U, MATH 1020U)	STAT 2800U Statistics and Probability for Engineers (MATH 1020U)	
2-3	CIVE 2300U Surveying (ENGR 1025U)					
3-1	CIVE 3100U Soil Mechanics and Hydrogeologic Engineering (CIVE 2100, MECE 2420U, MECE 2860U)	CIVE 3200U Indeterminate Structures and Steel Design (CIVE 2200U, ENGR 1025U)	CIVE 3300U Materials and Sensor Technologies (CIVE 2200U, MECE 2420U)	CIVE 3400U Principles of Transportation Engineering (ENGR 2100U)	ENGR 3011U Introduction to Railway Systems	ENGR 3150U Artificial Intelligence & Machine Learning (STAT 2800U, (ENGR 2100U or SOFE 2710U))
3-2	CIVE 3500U Construction Management (CIVE 2300U)	CIVE 3600U Introduction to Geotechnical Engineering (CIVE 3100U)	CIVE 3700U Infrastructure Systems and Sustainability (CIVE 3300)	CIVE 3800U Municipal Engineering Design (MECE 2860U)	CIVE 3900U Reinforced Concrete Design (CIVE 3300U)	ENGR 3360U Engineering Economics
4-1	CIVE 4100U Geotechnical Design (CIVE 3600U)	CIVE 4200U Intelligent Transportation Systems (CIVE 3400U, ENGR 3150U)	ENGR 4022U Railway Safety and Signalling (ENGR 3011U)	ENGR 4111U Capstone Systems Design I (Completion of all program-respective courses in Years 1 through 3)	ENGR 4760U Ethics, Law and Professionalism for Engineers	
4-2	CIVE 4400U Railway Track Design (CIVE 2100U, CIVE 2300U, CIVE 3300U)	ENGR 4033U Railway Rolling Stock (ENGR 3011U)	ENGR 4044U Railway Systems Operation and Maintenance (ENGR 3011U)	ENGR 4222U Capstone Systems Design II (ENGR 4111U)	Liberal Studies Elective	

Appendix E - List of Program Courses, New Course Proposals, Course Change Proposals, Course Descriptions for Existing Courses

List of Program Courses

	Course Code	Course Name	
Year 1	ENGR 1015U	Introduction to Engineering	Existing Course - course description enclosed
	ENGR 1050U	Engineering Communications and Technology Impacts	Existing Course - course description enclosed
	MATH 1010U	Calculus I	Existing Course - course description enclosed
	MATH 1850U	Linear Algebra for Engineers	Existing Course - course description enclosed
	PHY 1010U	Physics I	Existing Course - course description enclosed
	CHEM 1800U	Chemistry for Engineers	Existing Course - course description enclosed
	ENGR 1200U	Intro to Programming for Engineers	Existing Course - course description enclosed
	MATH 1020U	Calculus II	Existing Course - course description enclosed
	PHY 1020U	Physics II	Existing Course - course description enclosed
	ENGR 1025U	Engineering Design	Existing Course - course description enclosed
Year 2	CIVE 2100U	Geology for Engineers	NEW course - template enclosed
	MANE 2220U	Structure and Properties of Materials	Existing Course - course description enclosed
	MATH 2860U	Differential Equations for Engineers	Existing Course - course description enclosed
	MECE 2230U	Statics	Existing Course - course description enclosed
	CIVE 2200U	Structural Analysis	NEW course - template enclosed
	ENGR 2100U	Computational Engineering	Existing Course - course description enclosed
	MECE 2420U	Solid Mechanics I	Existing Course - course description enclosed
	MECE 2860U	Fluid Mechanics	Existing Course - course description enclosed
	STAT 2800U	Statistics and Probability for Engineers	Existing Course - course description enclosed
	CIVE 2300U	Surveying	NEW course - template enclosed
	LSE	Liberal Studies Elective	
Year 3	CIVE 3100U	Soil Mechanics and Hydrogeologic Engineering	NEW course - template enclosed
	CIVE 3200U	Indeterminate Structures and Steel Design	NEW course - template enclosed
	CIVE 3300U	Materials and Sensor Technologies	NEW course - template enclosed
	CIVE 3400U	Principles of Transportation	NEW course - template enclosed
	ENGR 3150U	Artificial Intelligence and Machine Learning	Existing Course - course description enclosed
	CIVE 3500U	Construction Management	NEW course - template enclosed
	CIVE 3600U	Introduction to Geotechnical	Existing Course - course description enclosed
	CIVE 3700U	Infrastructure Systems and Sustainability	NEW course - template enclosed
	CIVE 3800U	Municipal Engineering Design	NEW course - template enclosed
	CIVE 3900U	Reinforced Concrete Design	NEW course - template enclosed
	ENGR 3360U	Engineering Economics	Existing Course - course description enclosed
Year 4	ENG Elective	Engineering - Elective	
	ENGR 4111U	Capstone Systems Design I	Existing Course - course description enclosed
	ENGR 4760U	Ethics, Law and Professionalism for Engineers	Existing Course - course description enclosed
	CIVE 4100U	Geotechnical Design	NEW course - template enclosed
	CIVE 4200U	Intelligent Transportation Systems	NEW course - template enclosed
	CIVE 4300U	Highway Design	NEW course - template enclosed

	CIVE 4400U	Railway Track Design	NEW course - template enclosed
	ENGR 4222U	Capstone Systems Design II	Existing Course - course description enclosed
	LSE	Liberal Studies Elective	
	ENG Elective	Engineering Elective	
	ENG Elective	Engineering Elective	
ENG Electives	ENGR 4570U	Indigenous Design and Technology	Existing Course - course description enclosed
	CIVE 4000U	Special Topics in Civil Engineering	NEW course - template enclosed
	CIVE 4500U	Digital Water Infrastructure	NEW course - template enclosed
	CIVE 4600U	Environmental Design of Waste Disposal	NEW course - template enclosed
	CIVE 4700U	Data Science in Geotechnical Engineering	NEW course - template enclosed
	CIVE 4800U	Hydrology	NEW course - template enclosed
	CIVE 4850U	Environmental Hydraulics Design	NEW course - template enclosed
	CIVE 4900U	Building Sustainability	NEW course - template enclosed
	CIVE 4950U	Digital Project Delivery	NEW course - template enclosed

Course Descriptions

ENGR 1015U - Introduction to Engineering
An introduction to engineering, the profession and core skills of engineers. Topics include: history of engineering; introduction to Indigenous histories in Canada and the responsibility of engineers to consult and work with Indigenous peoples; fields in engineering; how systems work; an overview of computer systems; information technology trends and state-of-the-art applications (scientific computing, communications, and signal processing); role of engineers in society; Equity, Diversity, and Inclusion (EDI); impact of technology on the environment; core engineering skills including freehand sketching, basic engineering graphics and drafting techniques, engineering report writing and introduction to MATLAB programming; occupational health and safety, and safety standards.

ENGR - 1050U - Engineering Communications and Technology Impacts
In the first part of the course students will learn the principles of professional oral, written, visual, and interpersonal communication required to effectively communicate in an engineering career. Students will become familiar with common forms of engineering communications, such as technical reports, memos, proposals, emails, and presentations. In the second part of the course students will learn about the impacts of technology including the ethical, environmental, economic, social, and political issues raised by technological change. The focus will be on ways of thinking critically about both the remediation of already existing problems and the prevention of future problems.

MATH 1010U - Calculus I
Applications to science and engineering using differential calculus. Emphasis on limits, continuity, the derivative, Mean Value Theorem for derivatives and integrals, approximation by differentials, Fermat's Theorem, differentiation and anti-differentiation, definite integrals, areas between curves, and the Fundamental Theorem of Calculus.

MATH 1850U - Linear Algebra for Engineers
Develops the fundamental ideas of linear algebra and demonstrates their applications to other areas. Topics include the algebra of matrices; systems of linear equations; determinants and matrix inverses; real and complex vector spaces, linear independence, bases, dimension and co-ordinates; inner product spaces and the Gram-Schmidt process; least squares and regression; linear maps and matrices, change of basis and similar matrices; eigenvalues, eigenvectors and matrix diagonalization; quadratic forms.

PHY 1010U - Physics I
This calculus-based course is intended for students who have completed high school calculus. It gives an introduction to basic mechanics, Newton's laws of motion; kinematics and dynamics in one and two dimensions; work and energy; friction; momentum and collisions; angular momentum, torque and rotation of rigid bodies; gravitation; simple harmonic motion; mechanical and sound waves; static equilibrium; fluid mechanics; kinetic theory of gases and thermodynamics.

CHEM 1800U - Chemistry for Engineers
Introduction to the four sub-disciplines of modern chemistry: analytical, inorganic, organic and physical. Atoms, molecules, stoichiometry and gas laws; reactions, chemical kinetics, thermochemistry, entropy and free energy; electronic structure of atoms, bonding and molecular structure with emphasis on organic molecules; intermolecular forces, liquids and solids; electrochemistry, fuel cells and electrolytic cells.

ENGR 1025U - Engineering Design
A project-based introduction to the engineering design process, computer-aided drafting, and the use of design tools and software packages for engineering design. Open-ended design-build projects by individuals and groups and written and oral technical communications. Basics of project management including organizing, planning, scheduling, controlling, and application of spreadsheets and project management software.

ENGR 1200U - Introduction to Programming for Engineers
Introduction to the anatomy of a computer: CPU, memory, machine cycle, input and output devices, data representation; fundamental programming concepts: flowcharting, algorithm design, use of procedures, program control flow, arrays and vectors, arithmetic and logic operations, input and output, data declaration; programming in C++.

MATH 1020U - Calculus II
A continuation of Calculus I or Introductory Calculus emphasizing integral calculus: problem solving, calculations and applications. Applications to volumes, arc length, polar co-ordinates and functions of two or more variables. Multivariable calculus: partial derivatives, differential equations, Taylor and MacLauren series, double integrals.

PHY 1020U - Physics II
Introduction to electromagnetism and optics: electric charge and Coulomb's law; electric field, electric flux, Gauss' law; electrostatic potential, capacitance; Kirchoff's laws in DC circuits. Magnetic forces and magnetic field; Biot-Savart law; Ampere's law; magnetic flux, Faraday's law, inductance; AC circuits. Electromagnetic waves, geometrical and wave optics; nuclear structure and radioactivity.

MANE 2220U - Structure and Properties of Materials
Atomic structure and atomic bonding in solids, structure of crystalline solids, solidification and defects, role of crystalline defects on material properties, strengthening mechanisms, diffusion, binary isomorphous and eutectic systems and related alloys, mechanical properties of materials, polymers, crystalline ceramics, composites.

MATH 2860U - Differential Equations for Engineers
A study of differential equations that arise as models of phenomena in engineering. Topics include: first order equations; linear equations; second-order equations and their applications; systems of linear equations; series solutions; Laplace transforms; introduction to partial differential equations.

STAT 2800U - Statistics and Probability for Engineers
This course introduces the concepts and techniques of statistics and probability to collect, present, analyze and interpret data, and make decisions in the presence of variability. Students study a selection of topics relevant to engineering, selected from: sample spaces, probability, conditional probability, independence. Bayes' theorem, probability distributions, algebra of expected values, descriptive statistics. Discrete and continuous random variables; probability distributions: binomial, Poisson, normal, lognormal, Weibull, etc.; mean and variance; the central limit theorem; inferences concerning means, variances, and proportions. Parameter estimation, introduction to correlation and regression. Introduction to quality control and reliability.

ENGR 2100U - Computational Engineering Applications
Introduction to MATLAB and Python libraries and packages for numerical computing, the engineering applications of MATLAB and Python to the following areas: solving systems of linear algebraic equations, interpolation and curve fitting, finding the roots of equations, numerical differentiation and numerical integration, solving initial value problems, solving two-point boundary value problems, solving symmetric matrix eigenvalue problems, and introduction to engineering design optimization.

MECE 2230U - Statics
This course provides fundamental engineering knowledge of static systems, bodies at rest, force and moment equilibrium of rigid bodies, and mechanics of materials and deformable bodies. Course topics include: forces; moments of forces; couples; resultant and equilibrium of force systems; distributed loads; equilibrium of particles and rigid bodies; analysis of structures including beams, structural analyses including trusses, frames and machines; mechanical joints, the concept of internal forces, shear and moment forces and diagrams, relations between distributed load, shear and moments; friction forces on mechanical components, centroid, moment of inertia, parallel axis theory, Mohr's circle for moment of inertia, concept of virtual work.

ENGR 3150U - Artificial Intelligence and Machine Learning
Students will learn the fundamental aspects of Artificial Intelligence (AI) and Machine Learning (ML) and how to formulate and apply different machine learning models to engineering problems. Methods presented include linear and logistic regression, decision trees, random forest, adaptive boosting on tree stumps, K-Nearest Neighbour (KNN), Bayesian classification, support vector machines, and artificial neural networks. The course will also cover gradient descent optimization, the design of experiments, and statistical analysis methods that are relevant to the formulation, application, and evaluation of the discussed ML models. Examples of real-world applications of ML and AI will be covered.

MECE 2420U - Solid Mechanics I
This course provides the fundamental engineering knowledge of mechanics of solids including axial loading, plane stress and strain; tension and compression, elastic deformation and Hooke's law, Poisson's ratio, principle of superposition, thermal stress, torsion of circular shafts, pure bending, transverse shear, shear stress in beams and thin-walled members, combined loading, stress and strain transformations; Mohr's circle.

MECE 2860U - Fluid Mechanics
Fundamentals of fluid mechanics, including: properties of fluids and their units; fluid static. Kinematics of fluids, conservation of mass and the continuity equation. Dynamics of fluids; Euler equation; Bernoulli equation. The energy equation; energy grade lines. Flow of viscous fluids; laminar and turbulent flows; flow in pipes and fittings; the Moody diagram. Flows around immersed bodies; lift and drag on bodies. Boundary layers; flow separation. Flow measurement techniques.

ENGR 3360U - Engineering Economics
Aspects of theoretical and applied economics relevant to engineers, including an introduction to fundamental principles of micro and macroeconomics. Microeconomics topics include scarcity, opportunity cost, diminishing returns, elasticity, industrial organization, economies of scale and concentration. Macroeconomics topics include unemployment, inflation, economic growth, the multiplier, equilibrium, fiscal policy and monetary policy. The principle of money and banking are introduced along with the role of the Bank of Canada. Applied economics topics covered include cost concepts, time value of money, comparison of alternatives, depreciation, tax considerations, economic

analysis of projects, breakeven, sensitivity and risk, and decision models. Other topics covered include: economic decision analysis applied to private and public sector capital projects, discounted cash flow methods, lease analysis, replacement decisions, inflation impacts and public sector project analysis.

ENGR - 4111U - Capstone Systems Design I
This two-part capstone design course represents a culminating design experience for engineering students. The course allows senior-level students to integrate their engineering knowledge to solve an open-ended design problem while working as part of an engineering design team. Students will apply the engineering design process to a project of major breadth that will require them to integrate the knowledge that they have gained throughout their respective programs of study and apply it to the design and development of a complete system. Design teams will meet weekly with their project supervisor and attend several guest lectures during the semester. By the end of this first course, students will have completed the first stages of the engineering design process for their project culminating with a preliminary design report and proof-of-concept prototype presentation and demonstration. Note that students will finish the design and development of their systems in ENGR 4222U: Capstone Systems Design II.

ENGR - 4222U - Capstone Systems Design II
In this course, students will complete the design and development of the system that they first started in ENGR 4111U: Capstone Systems Design I. Design teams will meet weekly with their project supervisor and attend several guest lectures during the semester. By the end of this second course, students will have completed the engineering design process for their project culminating with a final design report and final prototype presentation and demonstration. Students will also showcase their completed projects at the Capstone Design Exhibition held at the end of the semester.

ENGR 4760U - Ethics, Law and Professionalism for Engineers
Legal aspects of engineering practice; business organizations and corporations; intellectual and industrial property; conflict resolution; tort liability and contract law; employment and labour law; public safety and health considerations; occupational health and safety and WHMIS; Canadian and international engineering standards and commercial practices; international trade; environmental laws and regulations; environmental stewardship and sustainable development; corporate social responsibility; equity. Ethics and moral philosophy; applied ethics; ethical aspects of engineering practice; engineering codes of ethics and ethical obligations of engineers; detecting ethical dilemmas and methods for resolving them; research ethics. The engineering profession and its history; engineering associations and societies; engineering licensure; the role and responsibilities of the professional engineer in society; engineers in industry, management and private practice.

ENGR 4570U – Indigenous Design and Technology
This course will explore design and technology of Indigenous peoples in Canada and the impacts on technology development. Two-Eyed Seeing (where with one eye we view the subject through Indigenous ways of knowing and with the other eye we view it through Western approaches) will be used to study the evolution of Indigenous design and technology and its influence on modern systems. Indigenous approaches to sustainability and its role in Indigenous design and technology will be investigated with the goal of engineers and designers incorporating this knowledge and methodologies in the development of new sustainable technologies.

Railway Specialization

ENGR 3011U – Introduction to Railway Systems
This course introduces railway systems including the environmental needs and contributions of railway systems in a global context. The course will cover the history of railways, the requirements of regulatory authorities and the factors considered in designing railway systems, including the main economic parameters of railway systems to be considered for any project. Engineering methodologies of railway systems, including design of metro, tram, and mainline/commuter systems will be covered along with the principles for managing the operational capability of railway systems.

ENGR 4022U – Railway Safety and Signalling
This course covers railway signalling systems and their role as the key device for managing the safety of railway systems. Students will learn the applicable principles and solutions employed in modern signalling systems for complex rail networks. Topics include signal technologies, safety, security, interlocking, and levels of automation.

ENGR 4033U – Railway Rolling Stock
This course covers the main elements of railway rolling stock. The primary objective of all rail systems is to optimise train and passenger traffic. Rolling stock must therefore be developed in the best possible way to meet this objective. This course provides future players in the rail sector with a global vision of what is important to consider for train development. Topics include dimensioning, traction systems, braking systems, bogies, and computing and control systems. Specific topics related to passenger trains include comfort and door design.

ENGR 4044U – Railway Systems Operation and Maintenance
This course covers the operation and maintenance of both urban and main line railway systems. Topics include: scheduling; Operations Control Centre (OCC); maintenance options, tools, procedures and training; emergency measures; and testing and commissioning.

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 2100U
Full Course Title: Geology for Engineers	
Short-Form Course Title (max. 30 characters)**:** Geology for Engineers	

Course Description

This course introduces physical geology with emphasis on topics relevant to engineering applications. It covers the identification and characteristics of minerals and rocks, mass movement processes, and the interpretation of aerial photographs, topographic maps, and geologic maps. Additional topics include surficial and subsurface geological processes, surface and groundwater systems, structural geology, and earth resources.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar		
Prerequisites for Banner		
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Identify major minerals and rocks using laboratory assessment.

2. Apply principles of Earth dynamics and structural geology to evaluate earthquake hazards and their potential effects on engineering structures.
3. Use knowledge of weathering and mass movement processes to assess slope behavior, stability, and associated risks.
4. Describe surface water and groundwater flow processes in relation to water resource management and subsurface conditions in fluvial and coastal environments.
5. Identify characteristics of glacial deposits using topographic maps, aerial photographs, and other forms of imagery.
6. Relate geological processes to Canada's resource-based economy, including oil, gas, and mineral resources.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	D
Problem Analysis	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	25%	0%	75%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 2200U
Full Course Title: Structural Analysis	
Short-Form Course Title (max. 30 characters)**:** Structural Analysis	

Course Description

This course covers fundamental topics in structural engineering by introducing the principles of static equilibrium. Topics include stability and determinacy of beams, trusses, and frames; force and deflection calculations; shear, axial, and bending moment diagrams; deflection analysis using moment-area and virtual work methods; and influence-line and superposition techniques. This course is a critical component for students in civil engineering, serving as a prerequisite for more advanced, specialized structural courses.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial: 2		**Other:**
Cross-listings		
Prerequisites for Calendar	MECE 2230U, MATH 2860U	
Prerequisites for Banner	MECE 2230U, MATH 2860U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Apply principles of static equilibrium to analyze plane and 3-dimensional structures by idealizing loads and supports, constructing free-body diagrams, and determining external reactions and internal forces.
2. Identify common truss configurations and calculate forces in truss members using the method of joints and the method of sections.
3. Recognize the sources of loads on structures and calculate design static wind and snow loads.
4. Develop axial force, shear force, and bending moment diagrams for statically determinate beams and frames and determine force effect envelopes using superposition of loading conditions.
5. Apply the Moment-area Method and Virtual Work Principle to calculate the deflections of statically determinate trusses, beams and two-dimensional frames.
6. Quantify the influence lines for statically determinate trusses and beams and apply them to determine maximum internal forces under moving loads.
7. Recognize the professional obligations of structural engineers as prescribed by legislation.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	D
Problem Analysis	D
Investigation	D
Professionalism	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 2300U
Full Course Title: Surveying	
Short-Form Course Title (max. 30 characters)**:** Surveying	

Course Description

This course introduces fundamental plane surveying theory and practices for civil engineering applications. Topics include the use of surveying instruments to measure elevations, distances, and angles; identification and correction of measurement errors; and processing field data to determine design parameters. The course also highlights the role of surveying in engineering practice and develops practical skills in the use of CAD packages for preparing clear and effective engineering drawings.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 2	**Lab:** 4	
Tutorial:	**Other:**	
Cross-listings		
Prerequisites for Calendar	ENGR 1025U	
Prerequisites for Banner	ENGR 1025U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	X
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

This course will be delivered in the Spring Semester of Year 2 in a compressed two week format and will feature extensive field work outside the classroom.

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Perform basic measurements of elevations, distances and angles using surveying equipment.
2. Determine the coordinates and elevation of a point using a given benchmark and base line.
3. Calculate and apply horizontal and vertical curve design data to layout highway curves and set grades using control station coordinates and relevant design parameters.
4. Prepare a site map to estimate excavation and backfill quantities.
5. Apply CAD tools to prepare clear and accurate engineering drawings.
6. Recognize the importance of surveying within the civil engineering context.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Investigation	D
Use of Engineering Tools	D
Individual and Team Work	D
Communication Skills	D

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences	X		
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3100U
Full Course Title: Soil Mechanics and Hydrogeologic Engineering	
Short-Form Course Title (max. 30 characters)**:** Soil Mech. & Hydrogeo. Eng.	

Course Description

This course introduces the fundamentals of geotechnical engineering. Topics include soil identification and classification, soil compaction, and seepage flow in soils, including Darcy's law, hydraulic gradients, and graphical methods for seepage analysis. In addition, students are introduced to geotechnical site investigation practices, including ground exploration methods, soil sampling techniques, and the use of field and laboratory tests to determine design parameters.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 2100, MECE 2420U, MECE 2860U	
Prerequisites for Banner	CIVE 2100, MECE 2420U, MECE 2860U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Identify and classify soils using grain size analysis, Atterberg limits, and the Unified Soil Classification System (USCS).
2. Draw theoretical and experimental compaction curves and determine soil properties.
3. Analyze and examine laboratory Proctor compaction test.
4. Explain the principles of seepage flow in soils, including critical hydraulic gradient and its engineering significance, and analyze seepage problems using Darcy's law and graphical methods.
5. Describe the purpose, structure, and methods of geotechnical site investigations, including ground exploration techniques and sampling procedures.
6. Understand the use of field and laboratory tests for determining parameters for geotechnical design.
7. Design a suitable site investigation for a given geotechnical structure.
8. Understand how soil and groundwater conditions influence the design, construction, and performance of municipal systems.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Problem Analysis	D
Investigation	D
Individual and Teamwork	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3200U
Full Course Title: Indeterminate Structures and Steel Design	
Short-Form Course Title (max. 30 characters)**:** Indeterminate Str. & Steel Des.	

Course Description

This course covers advanced analysis of statically indeterminate structures and steel design. Topics include classical and matrix methods for beams, trusses, and frames, structural deflections and influence lines. The course also addresses steel material properties, load paths, and the design of steel members, beam-columns, composite sections. In addition, the impact of engineering materials' life-cycle and the selection of lower carbon footprint alternatives are also addressed.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3	**Lab:**	
Tutorial: 1	**Other:**	
Cross-listings		
Prerequisites for Calendar	CIVE 2200U, ENGR 1025U	
Prerequisites for Banner	CIVE 2200U, ENGR 1025U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Analyze frame structures subjected to joint translations using the slope deflection method to calculate deflections, bending moment and shear diagrams.
2. Use the stiffness method to analyze truss, beam and frame structures and apply it for the analysis of indeterminate structures.
3. Analyze and design steel tension members and columns to satisfy both serviceability and ultimate limit states in accordance with CSA S16-19.
4. Design steel beams for shear forces and bending moments at Serviceability and Ultimate Limit States, using first principles or tables in CISC Handbook.
5. Design laterally unsupported steel beams, using tables in the CISC Handbook.
6. Analyze cross section for combination of axial tension and bending moment.
7. Calculate beam-column capacity using tables in the CISC Handbook.
8. Assess the impacts of engineering materials' life-cycle to identify options that reduce carbon footprint while meeting structural performance requirements.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Problem Analysis	D
Design	D
Use of Engineering Tools	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3300U
Full Course Title: Materials and Sensor Technologies	
Short-Form Course Title (max. 30 characters)**:** Materials & Sensor Tech.	

Course Description

This course introduces the mechanical and chemical properties of Portland cement concrete. Topics include cement chemistry, the carbon emissions associated with cement production, CO_2 storage potential, and low-carbon alternatives. The course also covers the cement's hydration processes, supplementary cementitious materials, chemical admixtures, and their effects on the rheological and mechanical properties of concrete. In addition, the course also introduces modern sensing, data acquisition, and post-processing techniques used in infrastructure monitoring, with emphasis on sensor network design, data collection, and interpretation of sensor data for assessing material and structural performance.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3	**Lab:** 2 (bi-weekly)	
Tutorial: 1	**Other:**	
Cross-listings		
Prerequisites for Calendar	CIVE 2200U, MECE 2420U	
Prerequisites for Banner	CIVE 2200U, MECE 2420U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand cement chemical composition, the hydration process and the role of additives in controlling concrete workability, strength, and durability.
2. Understand the carbon emissions associated with cement production, CO_2 storage potential, and low-carbon alternatives.
3. Analyze aggregate properties, including source, classification, gradation, and potential harmful effects on concrete.
4. Characterize the workability, mechanical performance, and durability of concrete mixtures and design a concrete mix that satisfy specified design requirements.
5. Characterize the workability of fresh concrete using standard tests and control its mechanical properties through appropriate mix proportioning, consolidation, and curing.
6. Understand the fundamental principles of modern sensing, data acquisition, and post-processing techniques used in infrastructure monitoring systems.
7. Design sensor networks and data acquisition systems for laboratory and field-based monitoring applications.
8. Apply mathematical models and engineering tools to analyze sensor data and assess system performance.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	D
Use of Engineering Tools	D
Impact of engineering on society and the environment	D

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3400U
Full Course Title: Principles of Transportation Engineering	
Short-Form Course Title (max. 30 characters)**:** Principles Transportation Eng.	

Course Description

This course introduces the fundamental principles of transportation engineering and planning. Topics include vehicle motion and human factors, geometric design, traffic modeling, capacity and level of service, transportation planning, management and simulation. It also covers the assessment of social and environmental impacts of transportation systems, including their influence on urban development and the effects of alternative vehicles, fuels, and transit systems.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	ENGR 2100U	
Prerequisites for Banner	ENGR 2100U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand highway geometric design and safety, traffic engineering, and transport planning application areas.
2. Identify key geometric elements of highways and the influence of human factors on roadway design.
3. Analyze traffic stream characteristics and interpret traffic flow behavior within highway networks using basic traffic flow theory.
4. Use specific computer software to solve transportation engineering, planning, and operations applications.
5. Evaluate transportation systems by integrating traffic flow theory and computational tools to support planning, design, and operational decision-making in highway networks.
6. Assess the social and environmental impacts of transportation such the impact of transportation corridors on urban form and suburban sprawl and impact of alternative vehicles, fuels and transit systems.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	D
Problem Analysis	D
Use of Engineering Tools	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. Human factors play a major role in road design, so the need to consider a diverse population will be emphasized in the course.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3500U
Full Course Title: Construction Management	
Short-Form Course Title (max. 30 characters)**:** Construction Management	

Course Description

This course introduces students to the planning and management of civil engineering projects, focusing on the effective coordination and optimization of space, time, and resources. Students explore the principles and practices of construction project management and gain practical insight through the analysis of real-world case studies. The course emphasizes the multidisciplinary and complex nature of decision-making in civil engineering, preparing students to address the challenges encountered in professional project planning and execution.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 2300U	
Prerequisites for Banner	CIVE 2300U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Apply principles of planning, execution, and control in managing construction projects.
2. Use professional planning and scheduling software to optimize project activities and resources.
3. Analyze and plan key project elements-time, cost, and quality-individually or in teams.
4. Develop awareness of real-world construction project management and resource utilization.
5. Examine management processes for effective use of construction resources and decision-making.
6. Recognize the importance of life-long learning to stay current with construction methods and professional competence.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Communication Skills	D
Professionalism	D
Economics and Project Management	D
Life-Long Learning	D
Ethics and Equity	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	20%	80%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The ability to work with a diverse team will be emphasized in the course.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3600U
Full Course Title: Introduction to Geotechnical Engineering	
Short-Form Course Title (max. 30 characters)**:** Intro. to Geotechnical Eng.	

Course Description

This course aims to provide students with the ability to analyze and interpret the engineering properties of soil through both theoretical learning and practical laboratory work. Topics include effective stress analysis, one-dimensional settlement and consolidation theories for clayey soils, time-rate of consolidation, shear strength of soils. The course also addresses the impacts of climate change on soil behaviour and performance of geotechnical systems.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3100U	
Prerequisites for Banner	CIVE 3100U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Calculate total and effective stresses, pore pressure in soils and determine stress distribution in the ground.
2. Analyze soil compressibility and settlement, including immediate and consolidation settlements.
3. Determine soil properties such as pre-consolidation pressure, compressibility, coefficient of consolidation, and stiffness from laboratory data.
4. Evaluate the rate of consolidation and degree of settlement for clay soils, including secondary consolidation.
5. Define and measure soil shear strength for sands and clays under short- and long-term conditions using laboratory, in-situ, and analytical methods.
6. Use Mohr-Coulomb failure criterion to define failure in soil.
7. Understand and evaluate the effects of climate change on soil behavior, particularly changes in pore water pressure and consolidation settlement associated with rising groundwater levels.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Problem Analysis	D
Investigation	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3700U
Full Course Title: Infrastructure Systems and Sustainability	
Short-Form Course Title (max. 30 characters)**:** Infrastructure Systems	

Course Description

This course introduces the fundamental design principles of urban infrastructure systems; namely energy, transportation, and municipal water/wastewater services. How systems are under increasing impact from the energy transition, climate change, and demographic and geopolitical shifts. Students will learn and apply key infrastructure standards such as CSA, ASCE 73, International Coalition for Sustainable Infrastructure.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3300U	
Prerequisites for Banner	CIVE 3300U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to: 1. Identify the key inputs and provisioning of energy, transportation and municipal infrastructure.

2. Understand and design the interrelated aspects of infrastructure systems such as energy within transportation systems.
3. Analyze key vulnerabilities in infrastructure systems as they relate to a changing climate.
4. Understand and apply critical infrastructure standards and regulations.
5. Understand and apply mechanisms to increase the resilience of infrastructure.
6. Understand the overall environmental impacts of infrastructure systems.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Problem Analysis	D
Design	D

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			

Other Types of Experiences:

Students will perform system design of infrastructure components. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal report documenting their findings.

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**
For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3800U
Full Course Title: Municipal Engineering Design	
Short-Form Course Title (max. 30 characters)**:** Municipal Eng. Design	

Course Description

This course aims to apply hydraulics and hydrology to the design of municipal water systems. Topics include hydrologic and statistical analysis of rainfall events, runoff quantification using appropriate models, and the design of stormwater drainage structures. The course also addresses the impact of urbanization on runoff, explore mitigation measures, gain proficiency in stormwater modeling software, and develop an understanding of municipal water distribution systems. In addition, it covers the impact of climate change on water availability and its implications for water resources management.

Credit Hours: 3	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3	**Lab:**
Tutorial: 1	**Other:**
Cross-listings	
Prerequisites for Calendar	MECE 2860U
Prerequisites for Banner	MECE 2860U
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	☐ **Equivalency***
Recommended Prerequisites	
Course Restrictions	
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)	
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Apply knowledge of hydrology and statistics to describe rainfall events.
2. Quantify the volume and rate of runoff resulting from rainfall events.
3. Design stormwater drainage structures, including storm sewers, culverts, street pavements, and open channels.
4. Identify the effect of urbanization on stormwater runoff.
5. Apply stormwater management practices, including detention facilities, flood routing, and mitigation of urban development impacts on water quantity and quality.
6. Use stormwater computer models effectively as part of the design process.
7. Analyze municipal water distribution systems, including estimating demand, storage requirements, pump selection, and network flow and pressure.
8. Assess the impact of climate change on water availability and scarcity and its implications for water resources management and infrastructure planning.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Investigation	D
Design	D
Use of Engineering Tools	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

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Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 3900U
Full Course Title: Reinforced Concrete Design	
Short-Form Course Title (max. 30 characters)**:** Reinforced Concrete Design	

Course Description

This course introduces the fundamental design principles of reinforced concrete structural elements including beams, slabs, short columns. Topics include design for flexure and shear, detailing requirements for reinforcement, bar cutoffs in flexural members, and deflection calculations.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3300U	
Prerequisites for Banner	CIVE 3300U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Identify reinforced concrete structural elements, relevant design codes, and strength and serviceability limit state requirements.

2. Calculate bending moments and shear forces, for simple reinforced concrete members under different loading cases.
3. Analyze and design reinforced concrete beams for flexure, including rectangular, T, and L sections, with appropriate reinforcement detailing.
4. Understand shear behavior reinforced concrete beams and design them to satisfy code requirements for shear design.
5. Design one-way and two way slabs, continuous beams, and short columns.
6. Calculate development lengths, bar cutoffs.
7. Calculate deflections reinforced concrete beams and slabs.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Problem Analysis	D
Design	D

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			

Other Types of Experiences:

Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4000U
Full Course Title: Special Topics in Civil Engineering	
Short-Form Course Title (max. 30 characters)**:** Special Topics in Civil Eng.	

Course Description

Contemporary topics at the advanced undergraduate level. Faculty presents advanced elective topics not included in the established curriculum.

Credit Hours: 3			
Contact Hours – please indicate total number of hours for each component			
Lecture: 3		**Lab:**	
Tutorial:		**Other:**	
Cross-listings			
Prerequisites for Calendar			
Prerequisites for Banner			
Co-requisites			
Prerequisites with concurrency (pre or co-requisite)			
Credit restrictions			☐ **Equivalency***
Recommended Prerequisites			
Course Restrictions			
Course Type	☒ **Core**	☐ **Elective**	☐ **Core or Elective**
Is the course: ☒ Undergraduate	☐ Graduate	☐ Professional (e.g. some Education courses)	
Grading scheme	☒ **N (normal alpha grade)**	☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to: 1. Demonstrate practical knowledge of an advanced undergraduate level topic of civil engineering.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

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For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4100U
Full Course Title: Geotechnical Design	
Short-Form Course Title (max. 30 characters)**:** Geotechnical Design	

Course Description

This course focuses on the analysis and design of common geotechnical engineering systems. Topics include analysis and design of shallow foundations, including bearing capacity, stress distribution, and settlement, as well as deep foundations. It also addresses lateral earth pressure theories and the design of retaining structures, including concrete retaining walls and sheet pile walls, with consideration of stability and safety requirements.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3600U	
Prerequisites for Banner	CIVE 3600U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Calculate the ultimate and allowable bearing soil bearing capacity.

2. Understand the factors considered in the general bearing capacity equation and identify the cases where the assumptions of the general bearing capacity equation are not applicable.
3. Design shallow foundations on clay or sand that satisfy the allowable bearing capacity requirements and the short and long-term settlement requirements.
4. Perform structural design of shallow foundations including strip footings, spread footings, eccentrically loaded footings, and combined footings.
5. Understand the load-carrying mechanisms and installation method and design single piles and pile groups that satisfy both the bearing capacity and the settlement requirements.
6. Understand the different theories of lateral earth pressure and their assumptions and apply Rankine and Coulomb theories to calculate the distribution of lateral earth pressure acting on retaining walls.
7. Design concrete retaining walls and sheet pile walls including cantilever and anchored types.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	A
Investigation	A
Design	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	60%	40%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4200U
Full Course Title: Intelligent Transportation Systems	
Short-Form Course Title (max. 30 characters)**:** Intel. Transportation Sys.	

Course Description

This course introduces the fundamentals of Intelligent Transportation Systems (ITS) and their role in modern transportation planning and management. It covers the use of information and communication technologies to enhance transportation safety, efficiency, reliability, and mobility. Students will develop systematic problem-solving skills for traffic operations and road safety and gain practical experience in implementing, simulating, and analyzing ITS using software tools and coding.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3400U, ENGR 3150U	
Prerequisites for Banner	CIVE 3400U, ENGR 3150U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand the fundamental concepts and framework of Intelligent Transportation Systems (ITS) and their role in modern transportation planning and management.
2. Explain the application of information and communication technologies in improving transportation safety, efficiency, reliability, active mobility and environmental gains.
3. Analyze major ITS applications, including travel demand management, traveler information systems, transit management, and connected and automated vehicles.
4. Explain the base technology applications in smart mobility, road safety, and active mobility.
5. Develop systematic problem-solving approaches and techniques for addressing issues in traffic operations and road safety.
6. Implement, simulate, and analyze intelligent transportation systems through software and coding.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Problem Analysis	A
Use of Engineering Tools	A
Impact of Engineering on Society and the Environment	A
Ethics and Equity	A

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4300U
Full Course Title: Highway Design	
Short-Form Course Title (max. 30 characters)**:** Highway Design	

Course Description

This course covers the principles and practices of highway geometric design with an emphasis on design controls, human factors, and the safety, operational, environmental, and economic implications of design decisions. Topics include the design of horizontal and vertical alignment and cross-section elements, intersection and interchange design, roadside design, hydraulic design of drainage systems for highways, and assessment of impacts related to wildlife crossings.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 2100U, CIVE 2300U, CIVE 3400U	
Prerequisites for Banner	CIVE 2100U, CIVE 2300U, CIVE 3400U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand the fundamental principles and design controls used in highway geometric design.
2. Incorporate human factors and safety considerations into roadway design decisions.
3. Design horizontal and vertical alignments and roadway cross-section elements in accordance with established design standards.
4. Evaluate the coordination of horizontal and vertical alignments to ensure safe and efficient roadway performance.
5. Analyze and design intersections and interchanges based on operational and safety requirements.
6. Design roadside elements, including barriers and guiderails, to enhance roadway safety.
7. Assess the wildlife-vehicle interaction and incorporate mitigation strategies, such as wildlife crossing systems, to minimize ecological disruption and improve roadway sustainability.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Problem Analysis	A
Design	A
Impact of engineering on society and the environment	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	60%	40%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. Human factors play a major role in highway design, so the need to consider a diverse population will be emphasized in the course.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4400U
Full Course Title: Railway Track Design	
Short-Form Course Title (max. 30 characters)**:** Railway Track Design	

Course Description

This course introduces the principles of railway track design and the role of railways in transportation infrastructure. Students will develop an understanding of the basic concepts, theories, and analytical methods used in the planning, design, construction, and operation of railway lines. Topics include essential aspects of railway alignment, survey and design, construction practices, maintenance, and technical management of railway systems.

Credit Hours: 3			
Contact Hours – please indicate total number of hours for each component			
Lecture: 3		**Lab:**	
Tutorial:		**Other:**	
Cross-listings			
Prerequisites for Calendar	CIVE 2100U, CIVE 2300U, CIVE 3300U		
Prerequisites for Banner	CIVE 2100U, CIVE 2300U, CIVE 3300U		
Co-requisites			
Prerequisites with concurrency (pre or co-requisite)			
Credit restrictions	☐ **Equivalency***		
Recommended Prerequisites			
Course Restrictions			
Course Type	☒ **Core**	☐ **Elective**	☐ **Core or Elective**
Is the course: ☒ Undergraduate	☐ Graduate	☐ Professional (e.g. some Education courses)	
Grading scheme	☒ **N (normal alpha grade)**	☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Explain the fundamental characteristics of railway transportation systems, including their historical development and current trends in high-speed and heavy-haul railways.
2. Describe and evaluate the main components of railway track systems, including rails, sleepers, fastening systems, ballast, and ballast-less track structures.
3. Apply railway track geometry principles to determine design parameters for straight and curved tracks, including gauge widening, superelevation, and transition curves.
4. Understand the structure of railway turnouts, and the measures for increasing turnout speed.
5. Identify and design the subgrade structure used in railway infrastructure.
6. Evaluate railway transportation capacity by considering factors such as the railway transportation capacity, forces acting on trains, traction mass, and operating speed and running time.
7. Design basic horizontal and vertical railway alignments, including open-line sections, station yards, bridges, tunnels, and culverts.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	A
Investigation	A
Design	A
Use of Engineering Tools	A
Impact of Engineering on Society and the Environment	A

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	60%	40%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4500U
Full Course Title: Digital Water Infrastructure	
Short-Form Course Title (max. 30 characters)**:** Digital Water Infrastructure	

Course Description

This course explores the digital transformation of water infrastructure, focusing on technologies that enhance monitoring, control, and optimization of water and wastewater systems. Topics include smart instrumentation, metadata management, preprocessing techniques, and data-driven modeling, process control, and optimization.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	ENGR 2100U	
Prerequisites for Banner	ENGR 2100U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand the role of smart instrumentation, sensors, and monitoring technologies in modern water infrastructure.
2. Manage and process environmental data and metadata using appropriate preprocessing and data management techniques.
3. Apply data-driven modeling methods to analyze and improve the performance of water infrastructure systems.
4. Develop and evaluate digital solutions such as soft sensors, predictive models, and advanced process control strategies.
5. Interpret data and modeling results to support informed decision-making in water infrastructure management.
6. Integrate smart sensing, data analytics, and modeling approaches to monitor, evaluate, and optimize the performance of water infrastructure systems.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	A
Problem Analysis	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4600U
Full Course Title: Environmental Design of Waste Disposal	
Short-Form Course Title (max. 30 characters)**:** Env. Design of Waste Disposal	

Course Description

This course focuses on the environmental design and preliminary planning of modern landfill facilities within integrated waste management systems. Topics include sources and characteristics of municipal solid waste, landfill leachate generation, and the technical, environmental, and regulatory considerations involved in site selection, design, construction, and operation of waste disposal facilities. Students apply engineering principles and computational tools to evaluate environmental impacts, particularly groundwater contamination, and develop a preliminary landfill design that meets engineering and legislative requirements.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3100U	
Prerequisites for Banner	CIVE 3100U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Apply key terminology and principles of hydrogeology and waste management, including the 3Rs (Reduce, Reuse, Recycle) in waste management strategies.
2. Describe and evaluate landfill types, leachate characteristics, and alternative waste treatment methods, including waste-to-energy technologies.
3. Design landfill systems, including barrier systems, base contours, and leachate collection, following regulatory standards.
4. Analyze environmental impacts of waste disposal and interpret relevant regulatory frameworks and approval processes.
5. Explain contaminant transport mechanisms and calculate leachate generation and percolation using quantitative methods.
6. Estimate landfill gas generation and composition and understand management and recovery strategies.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	A
Design	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4700U
Full Course Title: Data Science in Geotechnical Engineering	
Short-Form Course Title (max. 30 characters)**:** Data Science in Geotech. Eng.	

Course Description

This course introduces data science with its applications and limitations in geotechnical engineering. Topics include machine learning algorithms, unsupervised learning, feature engineering, deep learning methods, and generative adversarial networks. The course also includes practical applications in predictive modeling using environmental and sensor data, as well as image-based analysis for classification, feature extraction, and damage detection in engineering systems.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3600U, ENGR 3150U	
Prerequisites for Banner	CIVE 3600U, ENGR 3150U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Prepare and format data appropriately for a variety of machine learning models.
2. Select and implement suitable machine learning algorithms, including decision trees, support vector machines, and deep neural networks, for engineering applications.
3. Explain key concepts in machine learning, data science, big data, and artificial intelligence, and differentiate among them.
4. Critically evaluate the assumptions, limitations, and performance of different machine learning models.
5. Apply machine learning techniques for prediction of engineering variables using relevant environmental and sensor data.
6. Apply machine learning image analysis methods to classify engineering images, identify key features, and develop models for detecting and locating damage or defects.

CEAB Graduate Attributes:

Attributes	Covered in this Course
Knowledge Base	A
Investigation	A

CEAB Course Content Breakdown:

Math	Basic Science	Complementary Studies	Engineering Science	Engineering Design
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4800U
Full Course Title: Hydrology	
Short-Form Course Title (max. 30 characters)**:** Hydrology	

Course Description

This course focuses on occurrence, distribution, movement, chemistry of ground water within the geological environment. Topics cover hydrostratigraphy, aquifers and confining units, potentiometric surfaces, and field mapping of hydraulic heads and flow. Students explore groundwater flow theory, numerical modeling, and site investigation techniques. The course also covers the impact of compressed air storage on groundwater flow and pressure. Additional topics applications in contaminant hydrogeology, petroleum hydrogeology, economic mineral deposits, and geothermal energy are also addressed.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar	CIVE 3100U	
Prerequisites for Banner	CIVE 3100U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Evaluate and apply field, laboratory, and empirical methods to determine hydraulic conductivity and aquifer properties.
2. Interpret hydrostratigraphy, construct cross sections, and develop potentiometric surfaces and profiles from well and lithologic data.
3. Quantify groundwater flow, velocities, and vectors, and assess hydrologic impacts of development projects using environmental data.
4. Conduct regional, local, and site-scale hydrogeologic investigations using maps, imagery, and hydrologic databases.
5. Perform field measurements, including drilling, well installation, hydraulic head monitoring, and water sampling for geochemical analysis.
6. Analyze subsurface storage of compressed air (e.g., compressed air, CO_2, and hydrogen) and evaluate gas and liquid behavior in porous media and assess their impacts on groundwater flow and pressure.
7. Analyze pump and slug test data and explain key contaminant transport processes in groundwater systems.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	A
Investigation	A
Impact of Engineering on Society and the Environment	A

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4850U
Full Course Title: Environmental Hydraulics Design	
Short-Form Course Title (max. 30 characters)**:** Enviro. Hydraulics Design	

Course Description

This course applies the principles of hydraulics and fluid mechanics to environmental flows in open channels. It covers the analysis of open-channel flow behavior, river hydraulics, and the design of hydraulic structures, with emphasis on practical engineering applications. The course also develops awareness of water resources issues related to environmental flows and impact of climate change on flood frequency and magnitude.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:** 2 (bi-weekly)
Tutorial: 1		**Other:**
Cross-listings		
Prerequisites for Calendar	MECE 2860U	
Prerequisites for Banner	MECE 2860U	
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☒ **Core** ☐ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Classify open channel flow regimes and apply the principles of continuity, energy, and momentum to analyze hydraulic systems.
2. Analyze specific energy relationships, critical flow conditions, and hydraulic transitions in open channels.
3. Apply momentum concepts to hydraulic jumps, surges, and backwater effects, including stilling basin design.
4. Compute uniform and gradually varied flow in natural and artificial channels, including use of HEC-RAS for water surface profile analysis.
5. Design hydraulic structures such as channels and spillways, considering flood conveyance and flow control requirements.
6. Evaluate sediment transport and channel stability.
7. Assess the impact of climate change on flood frequency and magnitude.
8. Plan and design laboratory hydraulic investigations to support engineering design.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Problem Analysis	D
Investigation	D
Design	D
Impact of Engineering on Society and the Environment	D

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☒ **Yes** ☐ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: Students will perform experiments in a laboratory. Working in teams, they will collect experimental data, carry out the necessary analyses, and submit a formal laboratory report documenting their findings.			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4900U
Full Course Title: Building Sustainability	
Short-Form Course Title (max. 30 characters)**:** Building Sustainability	

Course Description

This course focuses on design concepts of climate responsive buildings including passive cooling and heating systems and key indicators of building performance. It covers modeling approaches for assessing climate loads and energy demand, in addition to the use of building simulation tools to select energy-efficient components and systems, and relevant regulatory and sustainability frameworks. The course further addresses the application of sustainable design principles to reduce energy consumption and greenhouse gas emissions while maintaining occupant comfort, health, and economic viability.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3		**Lab:**
Tutorial:		**Other:**
Cross-listings		
Prerequisites for Calendar		
Prerequisites for Banner		
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions		☐ **Equivalency***
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods: Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Explain the principles of sustainable building design, including passive design strategies.
2. Identify different building systems, with particular emphasis on the performance and function of building envelopes.
3. Analyze external climatic conditions and indoor environmental parameters and assess their impact on building performance.
4. Apply modeling approaches to simulate airflow, heat transfer, and moisture transport within building components and systems.
5. Assess passive cooling strategies and their effectiveness in reducing building energy demand.
6. Estimate building thermal loads and energy consumption using established engineering methods.
7. Utilize building energy simulation tools to model, analyze, and optimize building performance.
8. Interpret and apply green building regulations and standards in the context of sustainable design.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	A
Problem Analysis	A
Design	A
Use of Engineering Tools	A
Impact of Engineering on Society and the Environment	A

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	75%	25%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

NEW COURSE TEMPLATE

For changes to existing courses see Course Change Template

New courses must be entered into Curriculog prior to Faculty Council. Please use this template to provide the information to your Curriculog contact.

Faculty: Faculty of Engineering and Applied Science	
This new course is associated with: ☐ Minor Program Adjustment ☐ Major Program Modification ☒ New Program ☐ None	
Will this course appear anywhere other than the course description section of the Calendar?	☒ **Yes** ☐ **No**

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor*: Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map*: Course Placement*

A new course (core or elective) related to a Major Program Modification*: Major Program Modification*

A new course (core or elective) related to a New Program*: New Program proposal*

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

BEng and BEngM – Civil Engineering
BEng and BEngM – Civil Engineering and Co-op
BEng and BEngM – Civil Engineering with Railway Engineering Specialization
BEng and BEngM – Civil Engineering with Railway Engineering Specialization and Co-op

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

2027-2028

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2027

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

N/A

Subject Code: CIVE	**Course Number:** 4950U
Full Course Title: Digital Project Delivery	
Short-Form Course Title (max. 30 characters)**:** Digital Project Delivery	

Course Description

This course introduces the principles and applications of Building Information Modeling (BIM) and Digital Twins technologies in the design, construction, and operation of civil infrastructure. It covers BIM processes, workflows, and tools for model development and coordination, along with an evaluation of their benefits in improving project efficiency and collaboration. The course also explores Digital Twins concepts, including their development, integration with IoT for real-time monitoring, and application in asset management.

Credit Hours: 3		
Contact Hours – please indicate total number of hours for each component		
Lecture: 3	**Lab:**	
Tutorial:	**Other:**	
Cross-listings		
Prerequisites for Calendar		
Prerequisites for Banner		
Co-requisites		
Prerequisites with concurrency (pre or co-requisite)		
Credit restrictions	☐ **Equivalency***	
Recommended Prerequisites		
Course Restrictions		
Course Type	☐ **Core** ☒ **Elective** ☐ **Core or Elective**	
Is the course: ☒ Undergraduate ☐ Graduate ☐ Professional (e.g. some Education courses)		
Grading scheme	☒ **N (normal alpha grade)** ☐ **P (pass/fail)**	

***Equivalency:** Two courses are similar enough in content that they are considered equivalent so students can register in either course but they will only receive credit for one course in their program.

Course instructional method:

CLS (In Class Delivery)	X	HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Assessment Methods:

Assignments, quizzes, projects, and/or exams as determined by the course instructor.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning website, or contact them at teachingandlearning@ontariotechu.ca.)

Students who successfully complete the course should have reliably demonstrated the ability to:

1. Understand the fundamental concepts and applications of Building Information Modeling (BIM) and its role in design and construction lifecycle.
2. Apply BIM processes and workflows to support coordination, visualization, and information management in construction projects.
3. Evaluate the benefits and limitations of BIM in improving project efficiency, collaboration, and decision-making.
4. Apply BIM tools and techniques to civil engineering applications, demonstrating their use in facility design and construction.
5. Understand Digital Twins technology and its role in construction.
6. Create and manage Digital Twins for construction projects and integrate it with BIM and Digital Twins to optimize project outcomes.
7. Integrate Internet of Things (IoT) with Digital Twins for real-time monitoring and management of construction projects.
8. Employ Digital Twins and digital technologies for sustainable operation and maintenance of buildings and infrastructure assets.

CEAB Graduate Attributes:

Attributes	**Covered in this Course**
Knowledge Base	A
Problem Analysis	A
Use of Engineering Tools	A

CEAB Course Content Breakdown:

Math	**Basic Science**	**Complementary Studies**	**Engineering Science**	**Engineering Design**
0%	0%	0%	100%	0%

Does this course contain any experiential learning components? ☐ **Yes** ☒ **No**

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: ☐ **Yes** ☒ **NA**

Process of consultation, if applicable:

Have you considered the principles of Equity, Diversity, Inclusion, or Decolonization included when creating this new course? ☒ **Yes** ☐ **No** **Please explain:**

The Faculty of Engineering and Applied Science (FEAS) is fully committed to Equity, Diversity, Inclusion, and Decolonization (EDID), including in all of its courses. The material covered in this course is mathematical in nature and is generally not subject to these principles.

For students who have accommodation needs, existing Student Accessibility Services (SAS) support will be available to students who require specific accommodations.

Does this course contain any Indigenous content? ☐ **Yes** ☒ **No** ☐ **Unsure**

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the Protocol for Consultation with the Indigenous Education Advisory Circle.

Has the IEAC been contacted? ☐ **Yes** ☐ **No**

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? ☐ **Yes** ☐ **No**

If yes, have they completed their review? ☐ **Yes** ☐ **No** ☐ **N/A**

Financial Implications

See program proposal.

Pre-Faculty Council Approval Dates (e.g. Curriculum Committee, Program Committee):

Appendix F - Faculty Information

Please include here only those currently at the institution and affiliated with the program.

Name and Faculty Status/Rank	Terminal Degree	Home Faculty/Unit	Areas of Expertise	Role in New Program (Note if faculty will be teaching and/or supervising in the program)	Total Undergraduate Teaching (including New Program) (Note in bold type if faculty is a core course developer for the program)
Dr. Daniel Hoornweg Associate Professor	PhD	FEAS	Energy Policy, Urban Development, Sustainable Cities, Waste Management	Teaching Civil Engineering Courses	3-4 courses Civil Engineering
Dr. Dima Jawad Senior Teaching Professor	PhD	FEAS	Project Management, Risk Management, Sustainability and Resiliency of Infrastructure	Teaching Civil Engineering Courses	6-7 courses Civil Engineering
Dr. Ghaus Rizvi Professor	PhD	FEAS	Smart and Advanced Materials, Polymers and composites processing and characterization	Teaching – MANE 2220U	3-4 courses
Mr. Hidayat Shahid Associate Teaching Professor	MASc	FEAS	Mechanical & Industrial Engineering, Laboratory Development and Design experience	Teaching – ENGR 1015U, ENGR 1025U	6-7 courses
Dr. Jennifer McKellar Associate Professor	PhD	FEAS	Tools for the techno-economic and environmental assessment of energy systems	Teaching Civil Engineering Courses	3-4 courses Civil Engineering

Name and Faculty Status/Rank	Terminal Degree	Home Faculty/Unit	Areas of Expertise	Role in New Program (Note if faculty will be teaching and/or supervising in the program)	Total Undergraduate Teaching (including New Program) (Note in bold type if faculty is a core course developer for the program)
Dr. Martin Agelin-Chaab Professor	PhD	FEAS	Bluff body/ground vehicle aerodynamics, Turbulent flows and jets, Sustainable energy systems	Teaching – MECE 2860U	3-4 courses
Dr. Meaghan Charest-Finn Assistant Professor	PhD	FEAS	Advanced automation of complex systems, Model Predictive Control algorithms, Applied artificial learning methodologies	Teaching – ENGR 3150U	3-4 courses
Dr. Murat Aydin Associate Teaching Professor	PhD	FEAS	Computational Fluid Dynamics, Automotive Aerodynamics, Aerosol Transport, Fuel Cells, Constructal theory	Teaching – MECE 2230U	6-7 courses
Dr. Nasim Moallemi Associate Teaching Professor	PhD	FEAS	Electric Circuit, Electronics, Digital Systems, and Electrical Engineering Fundamentals, Microprocessor and Embedded Systems	Teaching – ENGR 4760U	6-7 courses
Dr. Remon Pop-Iliev Professor	PhD	FEAS	Processing Functionally Graded Polymeric Composites and Nanocomposites, Innovative Design Engineering	Teaching – Capstone	3-4 courses
Dr. Tanvir Qureshi Associate Professor	PhD	FEAS	Engineering Materials, Concrete, Inspection and Monitoring, Structural Technologies	Teaching Civil Engineering Courses	3-4 courses Civil Engineering

Name and Faculty Status/Rank	Terminal Degree	Home Faculty/Unit	Areas of Expertise	Role in New Program (Note if faculty will be teaching and/or supervising in the program)	Total Undergraduate Teaching (including New Program) (Note in bold type if faculty is a core course developer for the program)
Dr. Tao Liu Assistant Professor	PhD	FEAS	Computational biomechanics, Footwear science, Wearable technology, Assistive devices	Teaching – MECE 2420U	3-4 courses
*New Tenure/Tenure-Track (TTT) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	3-4 courses
*New Tenure/Tenure-Track (TTT) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	3-4 courses
*New Tenure/Tenure-Track (TTT) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	3-4 courses
*New Tenure/Tenure-Track (TTT) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	3-4 courses
*New Tenure/Tenure-Track (TTT) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	3-4 courses
*New Teaching Faculty (TF) Hire	PhD	FEAS	Civil Engineering	Teaching Civil Engineering Courses	6-7 courses
Various faculty members from the Faculty of Science	PhD	FSCI	Calculus, Physics, Chemistry, Linear Algebra, Statistics	Teaching - Foundational Mathematics and Physics courses	6-7 courses Mathematics/Science/Engineering

*The Faculty is initially hiring 5 Tenure/Tenure-Track (TTT) and 1 Teaching Faculty (TF) for the program. The nominal teaching load for TTTs is four courses and for TFs is seven courses, as such, a total of 27 courses are available to be taught. There are 16 core courses that need to be developed for the program along with seven electives for a total of 23 courses that will eventually need to be developed. It should be noted that the electives will be developed in a phased approach and not all of them will be offered in the initial years of the program. Further, as there are no graduate programs in Civil Engineering, faculty members' teaching loads will be at the undergraduate level. As such, there is sufficient capacity for the faculty hired for the program to develop the new courses. Note, any new courses in the program will be developed by TTT and TF faculty members, not sessionals.

With respect to the number of new sections of existing courses, the service courses offered by the Faculty of Science (CHEM, MATH, and PHY courses) and the Faculty of Social Science and Humanities (ENGR 1050U and liberal studies electives) are already offering 1-2 additional sections of each of the service courses as part of the growth of all the engineering programs at Ontario Tech. The increased enrolment caused by the Civil Engineering program is included already in these additional section offerings. Similarly for the engineering courses shared with other programs, the Faculty is already experiencing increased growth in these courses due to increasing enrolment in other programs. With the addition of the Civil Engineering program, the need for an additional section of these courses, e.g., ENGR 1015U, ENGR 1025U, ENGR 1200U, MANE 2220U, MECE 2230U, etc., will be required. The Faculty has existing teaching capacity in the other Departments to handle this increase.

Library Statement

NEW PROGRAM PROPOSAL
CIVIL ENGINEERING, B.ENG

April, 2026

Prepared by Kate Gibbings, Engineering Librarian

Summary

The Campus Libraries support teaching, learning, and research at Ontario Tech University with facilities, collections, and programming. This self-assessment provides information about the Library Services available to the Ontario Tech community, and the collections specific to the Faculty of Engineering and Applied Science, which demonstrate Ontario Tech's readiness to support the Civil Engineering program.

To browse all of our services and collections, please visit ontariotechu.ca/library

Library Collections

Books and E-Books

- Each program at Ontario Tech has a dedicated budget for print and electronic books, which is calculated based on the number of students, the number of faculty, and the average cost per book in the subject area
- The Ontario Tech and Durham College physical collections are completely integrated, and all students have access to over 90,000 items
- Ontario Tech is a member of a province-wide print lending program, which allows students to view and request titles from all other University libraries in Ontario
- The Campus Libraries participate in e-book Demand Driven Acquisition. Users can see all e-book titles available in their subject area via the Library's catalogue, even titles the library does not yet own. When a reader clicks to access the title, then the title is automatically purchased on demand. To the user, this process is seamless. For the Library, this ensures that the budget is only allocated to required titles

Digital Collections

- Ontario Tech is a consortial member of the Ontario Council of University Libraries and the Canadian Research Knowledge network
- Campus Libraries subscribe to 270 academic databases digital packages

Special Formats

- The Library provides access to special formats including data and statistics, standards and codes, educational curriculum materials, streaming videos, music, and archival materials.

New Materials

- Dedicated subject librarians curate collections specific to the course and program learning outcomes (CLO and PLOs) of their respective programs
- All students, staff and faculty at Ontario Tech can request a purchase through an accessible form on the Library's website

Collections Expenditures

Category	Expenditure
Electronic Databases and Journals	$ 1.7 million
Books and E-Books	$ 91,000
Book and E-Book Funds Allocated to Faculty of Engineering and Applied Science	$ 26,000

Databases Supporting Civil Engineering

Discipline-Specific	Multi-Disciplinary
• IEEE Xplore • Engineering Village (Compendex & INSPEC) • McGraw Hill Access Engineering	• ScienceDirect (Elsevier) • Web of Science • Environment Complete

Specialized Collections Supporting Civil Engineering

Name	**Type**	**Notes**
CSA OnDemand	Standards	Complete online collection of CSA standards and codes
Intertek i2i	Standards	Online collection of standards from a variety of publishers, curated through faculty and student requests (ISO, ASTM, etc.)
SAE Mobilus	Articles, Standards, eBooks, Reports	Online collection of SAE publications

Support for Research and Learning

Dedicated Librarian

- The Faculty of Engineering and Applied Science has a dedicated Subject Librarian, whose role involves:
  - Liaising with the faculty
  - 1:1 research consultation with students and researchers
  - Delivering library and information literacy instruction to students
  - Curating library collections relevant to the subject area

Research Guides

- The Library provides a research guide specifically tailored to each program in the Faculty of Engineering and Applied Science. A guide will be created for the Civil Engineering program upon program approval

- The Library curates general research guides on topics such as Indigenous resources, citation, copyright, 3D printing, and more

Workshops and Classes

- The Library offers customized in-class information literacy sessions. Session can be in-person or virtual; in the library or in the students' regular classroom; and synchronous or asynchronous
- General instruction sessions are available to students from all programs, including citation management, research data management, 3D printing, introduction to the library, and more
- Three asynchronous Library course modules are available in Ontario Tech's Learning Management System (LMS), Canvas. Professors can add the Library modules directly into their course shell

Reference and Research Support

- Librarians are available for research consultations in person, over the telephone, and online
- The Ask a Librarian service provides extended support to students during and beyond the opening hours of the Library. This virtual chat service is staffed by library workers, and does not use chatbots.
- The Library offers specialized support for systematic reviews and knowledge synthesis

Support for Generative Artificial Intelligence

- The Library provides supports for generative AI citation, generative AI copyright, and the allowable uses of licensed content in generative AI tools
- Other supports for generative AI are available from Student Life, and the Teaching and Learning Centre

Support for Scholarly Publishing

The library's dedicated Scholarly Communications and Copyright Librarian provides services to faculty in the following areas:

- Research data management
- Publishing compliance with the Tri-Council agencies
- Support finding and creating open educational resources (OERs)
- Copyright advice and compliance information
- Support for authors, including reviewing author agreements
- Administration of APC waivers for faculty publishing in open access

Through its consortial partners, the Library provides waivers for open access fees to many scholarly journals.

Facilities

- The Campus Libraries include the North Oshawa Library, which is the campus' main branch, and the Social Sciences, Humanities, and Education Library, which is located in downtown Oshawa
- The Library's locations include:
    - Extended library hours are available during peak season
    - Groups study rooms are available for student booking
    - Accessible workstations, and sit-stand desks
    - Computers and dual monitor workstations

Existing student supports
Ontario Tech University, as a relatively small campus community, has a centralized delivery model for student supports. All undergraduate students have access to an extensive support system that ensures a quality student experience. Each Faculty may provide additional, Faculty- or program-specific supports. In addition to the outlined services below, students may also take advantage of the Campus Bookstore, Housing and Living Resources as well as the Ontario Tech Student Union. Further information can be found at: http://studentlife.ontariotechu.ca/.

Faculty-Specific Support

The FEAS Academic Advising Office empowers all engineering students to take ownership of their education by providing personalized, comprehensive academic advising in a confidential and safe environment. The office strives to promote the personal growth of students by instilling a sense of responsibility and independence. The Academic Advisors are committed to helping students develop and reach their academic and personal goals.

The FEAS Academic Advising Office is comprised of four full-time advisors. They include one First Year Advisor and three Upper Years Advisors, along with a Manager of First Year Advising and a Manager of Upper Year Advising. The Academic Advisors work closely with the Department Chair for program related matters and to ensure that the advising needs of students in the program are met.

In recent initiatives by the University, both Managers have dual reporting to the Director of Academic Advising in the Office of the Deputy Provost (for all issues related to Human Resources, Training, and University wide policies and procedures) and to the Associate Dean, Academic within the Faculty (for all issues related to academic matters including but not limited to: course selection, academic standing, readmission, etc.) This model ensures consistency of Academic Advising across the University by developing University wide procedures and providing the required training/professional development while also ensuring that academic matters are contained within the program and the Faculty. It must be stated here that this new structure provides our engineering programs with the expected autonomy to better serve the students in each engineering discipline and relieve the Associate Dean of non-academic matters.

The services provided by Academic Advisors include, but are not limited to:

- Address questions and concerns related to all aspects of student life
- Help establish realistic educational goals and future planning
- Assist in appropriate course planning and sequencing according to the approved program map
- Assess and discusses academic performance, progress, and standing
- Provide strategies and resources for academic success
- Interpret academic policies and procedures
- Ensure all degree requirements are met for timely and successful graduation

- Provide guidance to students on the selection of engineering and liberal studies electives

Student Life

Student Learning Centre

Ontario Tech University fosters a high level of academic excellence by working with students, undergraduate and graduate, to achieve educational success. Faculty specific academic resources are available online and include tip sheets and videos. Academic specialists offer one-on-one support services in mathematics, writing, study skills, ESL and physics. With the additional support of peer tutors and workshops, the Student Learning Centre can also accommodate the needs of a specific course or program.

Student Accessibility Services

Ontario Tech University ensures that students with disabilities have equal opportunities for academic success. Student Accessibility Services operates under the Ontario Human Rights Code and the Accessibility for Ontarians with Disabilities Act. Services and accommodation support are provided for students with documented disabilities and include:

- Adaptive technology training
- Alternate format course material
- Learning skills support
- Testing support
- Transition support for incoming students

Student Accessibility Services also provides inclusive peer spaces, support groups, and skills workshops for students.

Career Readiness

Ontario Tech University offers comprehensive career service assistance, co-op and internship support and a variety of valuable resources to help students along their career paths, including:

- Assistance with creating effective job-search documents
- Career counselling
- Co-op and internships
- Interview preparation
- Job market information
- Job search strategies

The Career Centre hosts a variety of events during the academic year including employer information and networking sessions, job fairs and interviews conducted by leading employers.

Student Engagement, Equity and Inclusion, and ***Indigenous Education and Cultural Services***

The university supports students' successful transition and provides opportunities to develop leadership and professional skills throughout their university career. Services provided include:

- Equity and inclusivity programming and support groups
- Indigenous Education and Cultural Services provides space and supports for students to connect with Indigenous culture and resources
- Opportunities to grow and develop leadership skills through the Ambassador and Peer Mentorship program
- Orientation and events through first year
- Peer mentoring
- Services and supports for international and exchange students
- Specialized programming for first-generation, graduate, Indigenous, international, mature, online, transfer and diploma-to-degree pathways students

Student Mental Health Services

Student Mental Health Services helps students learn how to better manage the pressures of student life. Students can:

- Access short term counselling and therapy services
- Access tools and resources online to learn about mental health and how to maintain good health and wellness
- Attend drop-in sessions
- Participate in events, activities or support groups that promote positive health and well-being
- Work with a mental health professional to address concerns

Students in distress will also be provided with support and counselling as needed. There is no cost to students and services are confidential. For those who need long-term counselling support or specialized mental health services, Ontario Tech University will provide referrals to assist the student in accessing resources in the local community or in the student's home community.

Athletics and Recreation Facilities

Ontario Tech University offers a number of recreation facilities and fitness opportunities to meet all lifestyles and needs. On-campus facilities include the state-

of-the-art FLEX Fitness Centre which overlooks Oshawa Creek, five gymnasiums, a 200-metre indoor track, two aerobic/dance studios, the Campus Ice Centre, Campus Fieldhouse, a soccer pitch, a fastball diamond, squash courts and an indoor golf training centre. Students are able to participate in varsity and intramural sports as well as group fitness classes and personal training sessions.

Campus Health Centre

The Campus Health Centre provides assistance in numerous confidential health-care options including:

- A medical clinic with daily access to physician and nursing staff
- Treatment of disease, illness, and injury
- Allergy injections, immunizations, and influenza injections
- Complementary Health Services featuring acupuncture, chiropractic, custom orthotics, massage therapy, nutritional counselling, and physical therapy
- An on-site laboratory (blood work, STI testing, throat swabs, etc.)
- Gynaecological health-care and prescriptions

Student Awards and Financial Aid

Student Awards and Financial Aid (SAFA) is dedicated to helping students understand the variety of options available to finance their education. Budgeting and financial planning are essential to their success and SAFA is on hand to help create the right financial plan. Financial assistance can be in the form of bursaries, employment (both on-campus and off), parental resources, scholarships, student lines of credit and the Ontario Student Assistance Program (OSAP).

Teaching & Learning Centre

The mission of the Teaching and Learning Centre (TLC) at Ontario Tech University is to empower faculty to reach their potential as educators and to create a culture where effective teaching is valued. We champion the scholarship of teaching and implementation of pedagogy. We create valuable teaching and learning professional development experiences. We move Ontario Tech University towards being a leader in teaching excellence, ultimately leading to greater student success.

The TLC provides faculty with a range of tools and facilities to assist them in providing a rich learning experience for students. Experts at the TLC provide support in various areas including curriculum development, multimedia design, learning technology and in the overall improvement of teaching practice.

In addition, the TLC funds teaching-related projects from the Teaching Innovation Fund (TIF) for proposals by faculty members aimed at developing new methods in teaching and learning. The TLC facilitates teaching awards at the University and supports faculty in their application for external awards and funding opportunities that focus on teaching and learning.

Information Technology Resources

Ontario Tech University is a leader among North American universities in implementing and using curriculum and industry specific software in a technology-enriched learning environment (TELE). Our unique environment is adapted to each discipline based on faculty requirements and input for optimal student learning. We are committed to providing the greatest value for students' investment in education and technology while studying at Ontario Tech University.

One of the greatest advantages of Ontario Tech University's approach to TELE is that all students have equal access to the same technology, resources and services. Whether you are inside or outside of the classroom, your course-specific software allows you to work on your own or with others and enjoy seamless access to all Ontario Tech online resources. TELE supports Bring-your-own-device (BYOD) which provides you with laptop standards when acquiring the right laptop for your program and software support services onsite and online. An annual fee for TELE covers a wide range of program-specific software, technical software support, exam support and virus protection.

IT Services strives to provide quality services to students at Ontario Tech. To support these objectives, the following components are included:

Wireless network
Wireless internet connection is available in public areas and open-air locations around the Ontario Tech campus where students congregate (North Oshawa and Downtown locations).

Wired network
To ensure the success of the technology-enriched learning environment, a comprehensive data network has been installed on campus. This includes network drops in lecture halls and designated areas as well as network drops for each residence suite.

Ontario Tech students benefit from networked classrooms and learning spaces. Each ergonomically-designed space has data network connection access and electrical connections to ensure battery regeneration. In addition, classrooms include electronic projection equipment and full multimedia support.

Exam support services
IT Services provide hardware, software and technical support during examinations. IT team will be equipped with loaner laptops in the event of major technical issues.

Laptop repairs
IT Services provide on campus repairs on eligible laptop models.

IT Service Desk

The IT Service Desk is equipped with certified technicians and experienced IT professionals offering technical support services on a drop-in, call-in or email basis.

General Use Workstations (GUWs)
Ontario Tech undergraduate students are able to use general workstations available at the library and have access to Bring Your Own Device Technology-Enriched Learning Environment (BYOD TELE) model course-specific software.

Software Support
Software Support specialists are available to students on-site and online to assist in downloading/installing University software and support any other software related issues.

Printing services
Printing services are available to students in the following areas: labs, classrooms, study common areas, the Learning Commons and the Library. All Ontario Tech students receive print credits every year, more Printpacks can be purchased through the Campus Bookstore if students require additional printing services.

Appendix J - Feedback from Stakeholders

ALSTOM

CANADA / HUMAN RESOURCES

1101 Rue Parent, Saint-Bruno-de-Montarville, QC
J3V 6E6
Office: + 1450 441 3060
Cell: +1 514 240 9953
www.alstom.com

Montreal, 2026 April 15

Object : Letter of Support for the Undergraduate Degree in Civil Engineering

Dear Scott Nokleby,

On behalf of Alstom, we are pleased to provide our support for the proposed undergraduate degree in Civil Engineering at Ontario Tech University. As a global leader in smart and sustainable rail mobility, Alstom is deeply committed to advancing education that supports rail transportation.

The proposed Civil Engineering program, with its focus on infrastructure, is a unique program that will train the next generation of civil engineers to meet the needs of industry, including those in the transportation sector. The demand for engineers with infrastructure expertise in Canada is growing. Alstom has numerous projects in the works in the Greater Toronto Area such as GO Expansion (OnCorr) or the New Subway Train (NST) for TTC; but also in Canada such as Montreal's REM project or the Tramway for Quebec city; and finally in North America such as New York's subway.

A unique aspect of the program is the Railway Engineering Specialization. Alstom has already worked very closely with the Faculty of Engineering and Applied Science at Ontario Tech in the development of its new undergraduate Railway Engineering Specialization. This specialization is already offered in a number of other engineering programs at Ontario Tech. The demand for engineers with railway expertise continues to grow yearly. The proposed Civil Engineering program with its Railway Engineering Specialization is another key piece in filling the talent pipeline that the rail sector in Canada urgently needs.

We look forward to our continued partnership with Ontario Tech and the launch of the new undergraduate Civil Engineering program.

Sincerely,



Edouard SPRIET
Vice President of Human Resources, Alstom Americas
Mail : edouard.spriet@alstomgroup.com
Phone : (+1) 514-240-9953

AtkinsRéalis

Scott Nokleby
Professor and Interim Dean
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON L1G 0C5

Dear Scott Nokleby

May 5th, 2026

On behalf of AtkinsRéalis we are pleased to provide our support for the proposed undergraduate degree in Civil Engineering at Ontario Tech University.

AtkinsRéalis is a world-leading professional services and project management company, committed to shaping a better future for our planet and those who inhabit it. We create sustainable solutions that connect people, data, and technology to transform the world's infrastructure and energy systems. We leverage global capabilities at the local level to provide our clients with unique, comprehensive services covering the entire asset lifecycle – including consulting, advisory and environmental services, smart networks and cybersecurity, design and engineering, procurement, project and construction management, operations and maintenance, decommissioning, and capital. As an industry leader in large scale infrastructure projects, we know first-hand the importance of having trained in Canada engineers.

AtkinsRéalis
455 boul. René-Lévesque O
Montréal
QC
H2Z 1Z3

atkinsrealis.com

The proposed Civil Engineering program, which focusses on infrastructure, is a unique program that will train the next generation of civil engineers that the sector needs. The demand for engineers with infrastructure expertise continues to grow yearly.

AtkinsRéalis has numerous projects in the works, such as Alto HSR, the Eglinton Crosstown Light Rail Transit in Toronto, the Réseau express métropolitain (REM) in Montréal, the Gordie Howe International Bridge connecting Windsor and Detroit, as well as major upgrades to water treatment facilities across Ontario and sustainable urban development initiatives in Vancouver.

A unique aspect of the program is the Railway Engineering Specialization.

AtkinsRéalis has already worked closely with the Faculty of Engineering and Applied Science at Ontario Tech in the development of its new undergraduate Railway Engineering Specialization that is currently available in other engineering programs at Ontario Tech. The demand for engineers with railway

expertise continues to grow yearly. The proposed Civil Engineering program with its Railway Engineering Specialization is another key piece in filling the talent pipeline that the rail sector in Canada urgently needs.

We look forward to our continued partnership with Ontario Tech and the launch of the new undergraduate Civil Engineering program.

Yours sincerely,

Adrian Nicolescu

Adrian Nicolescu

Principal Director, Talent Acquisition

AtkinsRéalis

diamond
schmitt

384 Adelaide Street West, Suite 100
Toronto, ON M5V 1R7
t: 416 862 8800

1075 West Georgia Street, Suite 1701
Vancouver, BC V6E 3C9
t: 604 674 0866

1776 Broadway, Suite 2200
New York, NY 10019
t: 212 710 4329

www.dsai.ca
info@dsai.ca

July 29, 2026

Dean Hossam Kishawy, Ph.D., P.Eng.
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1H 7K4

Re: Letter of Support for Civil Engineering Program

Diamond Schmitt Architects is pleased to share this letter in support of the Faculty of Engineering & Applied Science's proposal to introduce new undergraduate programs at Ontario Tech University (OTU). We understand the Civil Engineering program will educate students to plan, design, analyze, and build, as well as operate and manage infrastructure in today's changing world. The program aims to prepare graduates with the knowledge and skills required to design and assess sustainable and resilient infrastructure, including structural, transportation, geotechnical, environmental, and municipal systems. This will provide students with a comprehensive foundation in civil and community infrastructure systems while integrating Artificial Intelligence (AI) applications with engineering fundamentals. Specialized courses and project-based learning will prepare graduates to develop and implement intelligent and robust systems that enhance infrastructure and service resilience, efficiency, and sustainability.

As one of Canada's leading architectural firms, with global reach, we are leaders in sustainable design for our resilient future. We strongly support this new program initiative at OTU, which will expand opportunities for Canadian university educated engineers that have the skills to support the diverse range of engineering solutions for the future. In our studio, design continues to require interdisciplinary expertise in a variety of engineering fields for climate and energy solutions as well as construction, and site development.

diamond schmitt

Diamond Schmitt collaborates with engineering professionals everyday having developed an enviable portfolio of zero carbon, high energy performance and innovative design solutions for buildings across all sectors, including academic, health care, civic uses, residential and more. We are proud to have developed and incorporated geo-exchange, solar array and solar façade technology in the design of many of our award-winning buildings.

We recognize the benefits of the proposed expanded engineering programs at Ontario Tech University. We look forward to hearing about the success of the new programs and engaging with their graduates in the future.

Sincerely,



Michael Szabo, Architect
Principal



Lisa A. Prime, MCIP RPP, LEED AP
Sustainability Director

July 8, 2026

The Regional Municipality of Durham

Community Growth and Economic Development Department

605 Rossland Road East
Level 4
PO Box 623
Whitby, ON L1N 6A3
Canada

905-668-7711
1-800-372-1102
Sandra.Austin@durham.ca

durham.ca

Sandra Austin
Commissioner of Community Growth and Economic Development

Dean Hossam Kishawy, Ph.D., P.Eng.
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1H 7K4

To Dean Hossam Kishawy,

Re: Letter of Support for Civil Engineering Program

I am pleased to provide this letter in support of Ontario Tech University's proposal to establish a Civil Engineering program as a timely and important initiative that will contribute to the development of a skilled workforce capable of addressing current and future infrastructure challenges.

The proposed program represents a significant investment in the future workforce of Durham Region and will help address the growing demand for highly skilled professionals capable of planning, designing, analyzing, building, operating, and managing the infrastructure that supports our communities and economy. As Durham Region continues to experience growth and investment in transportation networks, housing, municipal infrastructure, environmental protection, and sustainable development, the need for qualified civil engineering professionals will continue to increase.

Ontario Tech University's proposed Civil Engineering program is particularly well-positioned to meet these needs. By preparing graduates with the knowledge and skills required to design and assess sustainable and resilient infrastructure, including structural, transportation, geotechnical, environmental, and municipal systems, the program directly aligns with the priorities and future growth opportunities of our region. The emphasis on infrastructure resilience and sustainability will help ensure that Durham Region has access to professionals equipped to address emerging environmental, economic, and community challenges.

If this information is required in an accessible format, please contact 1-800-372-1102, ext. 2548.

The program's integration of Artificial Intelligence (AI) applications with engineering fundamentals is important. By combining specialized technical knowledge with project-based learning, graduates will be prepared to develop and implement intelligent, efficient, and robust infrastructure systems that enhance service delivery, sustainability, and operational resilience. This approach will help build a workforce capable of leveraging new technologies to support modern infrastructure planning and development.

Of particular importance to the Region, the program will contribute to building and retaining a strong local talent pipeline. Providing students with the opportunity to pursue a civil engineering education within Durham Region will help attract, develop, and retain highly skilled individuals who can contribute to the success of local municipalities, construction firms, consulting engineering companies, environmental organizations, and other key sectors.

The proposed Civil Engineering program also creates opportunities for meaningful collaboration between Ontario Tech University, industry partners, municipalities, and community organizations. These partnerships will help ensure graduates acquire practical, industry-relevant experience while supporting workforce development initiatives that respond to the evolving needs of employers throughout the region.

We believe this program will be a valuable addition to Ontario Tech University's academic offerings and an important contributor to Durham Region's long-term prosperity, sustainability, and infrastructure development. We are pleased to support this proposal and look forward to the positive impact it will have on our community and workforce for years to come.

Sincerely,



Sandra Austin
Commissioner of Community Growth and Economic Development
The Regional Municipality of Durham

If this information is required in an accessible format, please contact 1-800-372-1102, ext. 2548.

E.S. FOX LIMITED.
984 Farewell Street South, Unit #1,
Oshawa ON, L1H 6L6.
TEL: (905) 723-7890

NUCLEAR SERVICES

To Whom It May Concern,

My name is David Tripp, and I am the director of Engineering for ES FOX Nuclear Services. I have been involved in the execution of nuclear projects for over 17 years and recognize the growing need for civil and structural engineering resources, as the vast majority of Engineering graduates have mechanical or electrical backgrounds. This need is even more heightened with the upcoming new large-scale nuclear builds, where these resources will play a critical role in the execution of these projects.

Ontario Tech has tailored its program to provide real-world experience, allowing students to transition smoothly from the classroom to the workforce. As a previous graduate from UOIT/Ontario Tech, I can attest firsthand how this real-world application set students up for success. Courses such as Indeterminate Structures and Steel Design, Geotechnical Engineering, and Reinforced Concrete are courses that focus specifically on principles that civil and structural engineers apply on a daily basis in professional practice.

Sincerely,

David Tripp, P.Eng.
Director of Engineering and Proposals
ES FOX Nuclear Services

455 Phillip St
Waterloo, ON N2L 3X2
Canada
www.ghd.com

15 July 2026

Dean Hossam Kishawy, Ph.D., P.Eng.
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON L1G 0C5

Re: Letter of Support for Ontario Tech University's Proposed Civil Engineering Program

Dear Dean Kishawy:

On behalf of GHD we are pleased to provide this letter of support for Ontario Tech University's proposed Civil Engineering program.

As a global professional services company delivering engineering, environmental, construction, and advisory services, GHD recognizes the critical and growing need for highly skilled civil engineers to support Ontario's infrastructure priorities and economic growth. Indeed, we feel that Ontario Tech University's program will provide students with access to the education they need to launch successful careers and good-paying in-demand jobs, ensuring Ontario has the workforce to support a competitive, resilient, and self-reliant economy.

The civil engineering discipline is foundational to the planning, design, delivery, operation, and renewal of the infrastructure systems that support our communities and our economy. At GHD, our professionals work across transportation, water, energy, environmental, buildings, industrial, and defence sectors, helping clients deliver projects that improve quality of life, enhance resilience, and support long-term prosperity and civil engineers play an essential role converting investments into the real lasting benefit of our communities.

Ontario is entering a period of unprecedented infrastructure investment growth, of which technically proficient professionals are required to both design and maintain to realize the value of this investment for future generations. Federal, provincial, and municipal governments are making significant commitments to strengthen transportation networks, modernize water and wastewater systems, enhance energy security and reliability, support housing growth, and advance national defence capabilities. Successfully delivering these investments will require a strong domestic talent pipeline of civil engineers equipped with the technical knowledge, practical experience, and interdisciplinary skills needed to execute increasingly complex projects across essential infrastructure sectors.

We believe Ontario Tech University's proposed Civil Engineering program is well positioned to contribute to this need in a very meaningful way, and at a time where delivering training and skills development often requires materially different approach to achieve the new outcomes our industry is seeking. A modern civil engineering curriculum that integrates sustainable infrastructure, transportation systems, water resources, construction innovation, digital engineering, project delivery, climate adaptation, and the ingredients of professional technical leadership and management, will prepare graduates to meet the evolving needs of industry. These professional competencies are essential as infrastructure owners, builders and operators, and the broader supply chain of service providers, seek solutions that are more sustainable, technologically advanced, cost-effective, and resilient.

As an organization actively involved in the delivery of major infrastructure projects across Ontario, such as the Ontario Line, the Garden City Skyway Bridge Twinning, and the Woodbine GO Station, GHD understands the importance of developing engineering talent domestically and the long-term opportunity

this provides. Here in Ontario, GHD has added 100 new employees every year for the past three years. We now have over 1,300 employees with offices across the province, including Whitby, Toronto, Peterborough, Markham, Mississauga, Ottawa, Peterborough, St. Catharines and our Americas Headquarters in Waterloo.

Through GHD's partnerships with Ontario's universities, we have seen first-hand the vital role they play in preparing future engineers to design and deliver the infrastructure that supports economic competitiveness, community well-being, environmental stewardship, and national security. We believe graduates from this program at Ontario Tech University will be positioned to contribute meaningfully to projects that advance Ontario's priorities in transportation, energy, water, housing, and defence which are essential for prosperous and resilient Ontario.

We welcome opportunities to engage with Ontario Tech University as the program develops, including through industry consultation, student work-integrated learning placements, guest lectures, capstone projects, research collaboration, and future recruitment initiatives. Strengthening connections between academia and industry will be critical to ensuring graduates are prepared to contribute effectively from the outset of their careers.

GHD strongly supports Ontario Tech University's proposed Civil Engineering program and we believe it will make a meaningful contribution to addressing Ontario's and Canada's growing demand for civil engineering professionals. We look forward to the program's success and to the contributions its graduates will make toward building and maintaining world-class infrastructure across the country.

Regards

Ryan Shepherd, P. Eng, ICD.D
Executive Vice President - General Manager, Canada Central

519 340 3862
Ryan.shepherd@ghd.com

Steve Lecuyer
Executive General Manager, Canada

514 339 0765
Steve.lecuyer@ghd.com

Copy to: Richard Moore – Clients & Markets Lead, Canada Central
Douglas Smith – General Manager – Technical Services, Americas

August 4, 2026

Dean Hossam Kishawy, Ph.D., P.Eng.
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1H 7K4

Re: Letter of Support for the Proposed Civil Engineering Program

Dear Dean Kishawy,

I am writing on behalf of the International Coalition for Sustainable Infrastructure (ICSI) to express our strong support for Ontario Tech University's proposal to establish a new Civil Engineering program. ICSI is the global movement for engineering action on infrastructure sustainability, resilience and climate change. Founded in 2019, we bring together change agents from across the engineering, finance, academic, policy and philanthropic communities to solve the systemic problems that sit at the intersection of climate change, ecosystem degradation, ageing infrastructure and underinvestment.

Engineering education has not kept pace with what the climate and nature crises demand of us. We are still training engineers for the world we had, not the one we are heading into. Every region we work in faces a similar combination of pressures: infrastructure ageing faster than it is being renewed, climate change rewriting the assumptions behind past design standards, nature declining at an unprecedented pace, and a widening gap between the scale of investment needed and what is currently committed. Closing that gap depends on a new generation of engineers able to plan, design and manage infrastructure that is structurally sound, resilient and sustainable over its full lifecycle.

Our own research points to a specific and urgent part of this challenge: education itself. In our recent work with Lloyd's Register Foundation on nature-positive engineering, we found that engineering curricula still tend to prioritise conventional technical content, often treating environmental and systems thinking as an add-on rather than a core part of an engineer's training. Closing this gap means integrating ecological principles, systems thinking and long-term resilience planning into the fabric of engineering education from the outset. The Civil Engineering program you have proposed, with its stated aim to prepare graduates in sustainable and resilient infrastructure design across structural, transportation, geotechnical, environmental and municipal systems, while integrating AI applications with engineering fundamentals, reflects exactly the direction we believe engineering education needs to take.

ICSI is pleased to support this proposal in principle and would welcome the opportunity to stay engaged as the program develops, including connecting your faculty and future graduates with our network of practitioners working on sustainable and resilient infrastructure around the world. We wish you every success with the proposal and look forward to hearing how it progresses.

Sincerely,



Savina Carluccio
Executive Director
International Coalition for Sustainable Infrastructure
www.sustainable-coalition.org

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STRUCTURAL ENGINEERS

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Hossam Kishawy, P.Eng, PhD.
Professor and Dean
Automotive, Mechanical and Manufacturing Engineering
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1G 0C5

July 10, 2026

Attn.: **Prof. Hossam Kishawy**, *P.Eng, PhD.*

Re: **Letter of Support for the Civil Engineering Program**

Dear Prof. Kishawy,

On behalf of IE Design, I am pleased to express our support for Ontario Tech University's proposal to establish an undergraduate program in Civil Engineering. At IE Design, structural engineering consulting services are offered in the analysis, design, and optimization of buildings and infrastructure with creative, efficient, and practical structural engineering solutions. Through our work on a diverse range of projects, we have observed an increasing demand for civil engineers with strong analytical capabilities and proficiency in advanced computational tools and digital design technologies. As infrastructure and building projects become more complex, the need for graduates who can integrate engineering fundamentals with innovative design approaches continues to grow.

The proposed Civil Engineering program provides a unique curriculum that equips students with the broad technical knowledge and engineering expertise required for the planning, design, construction, and management of sustainable and resilient civil infrastructure. The curriculum incorporates innovative and specialized courses that address advances in engineering technologies, digital transformation, and the application of artificial intelligence to address complex real-world engineering challenges. Examples of these courses include ENGR 3150U Artificial Intelligence & Machine Learning, CIVE 4200U Intelligent Transportation Systems, CIVE 4700U - Data Science in Geotechnical Engineering, and CIVE 4950U - Digital Project Delivery.

We are confident that graduates of the proposed Civil Engineering program will be well prepared to meet the evolving needs of the engineering industry by applying technical knowledge, critical thinking, and innovative design practices to the infrastructure projects. IE Design fully supports Ontario Tech University's proposal and looks forward to future opportunities for collaboration.

Regards,
IE Design
Intelligent Engineering Design ltd.

2026.07.10
07:56:54-04'00'

Mahdy A. Hamada, *Ph.D., P.Eng.*
President

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July 9, 2026

Hossam Kishawy, P.Eng, PhD.
Professor and Dean
Automotive, Mechanical and Manufacturing Engineering
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1G 0C5

RE: Letter of Support for the Civil Engineering Program

Dear Prof. Kishawy,

This letter is prepared in support of the Faculty of Engineering & Applied Science's proposal to introduce a new undergraduate program in Civil Engineering at Ontario Tech University. As a firm providing Planning; Surveying; Building Design; and Civil, Structural, Mechanical, and Electrical Engineering services across Canada, SBM strongly supports this initiative in response to the growing demand for highly qualified Civil Engineers capable of addressing the evolving challenges associated with infrastructure development, transportation systems, municipal engineering, and sustainable community design.

The proposed Civil Engineering program offers a comprehensive curriculum that integrates fundamental engineering principles with modern analytical, computational, and design methodologies. The program provides students with a strong foundation in structural, geotechnical, transportation, environmental, and infrastructure engineering with emphasis on the principles of sustainability, smart technologies, and energy efficiency. The learning outcomes of the proposed program will produce graduates with the technical expertise, problem-solving abilities, and professional competencies required to contribute effectively to the planning, design, construction, operation, and maintenance of civil infrastructure. These graduates will be well positioned to meet the increasing workforce demand across consulting engineering firms, municipalities, transportation authorities, and the construction industry.

We look forward to hearing about the success of the Civil Engineering program at Ontario Tech University and engaging with their graduates.

Respectfully submitted,

Strik, Baldinelli, Moniz Ltd.
Planning • Civil • Structural • Mechanical • Electrical

Kevin Moniz, P.Eng.
Principal

July 30, 2026

Dean Hossam Kishawy, Ph.D., P.Eng.
Faculty of Engineering and Applied Science
Ontario Tech University
2000 Simcoe Street North
Oshawa, ON, Canada L1H 7K4

Re: Letter of Support for Civil Engineering Program

Dr. Kishawy,

WSP in Canada is pleased to provide our support for the development of a Civil Engineering Program at Ontario Tech University in Oshawa.

As Canada's largest design, engineering and environmental services firm, with over 13,500 employees across more than 100 communities, almost 5,500 of which are here in Ontario, we rely on post-secondary institutions to provide well-educated, thoughtful, and inspired new graduates that are eager to be a part of our workforce. We rely on local professionals to create local solutions for local projects.

Durham Region, and the surrounding communities, has become a focal point of infrastructure development over the past decade. The expansion of the transportation network with Highways 407, 412, and 418, the extension of Go Train services on the Lakeshore East corridor, and the refurbishment of the Darlington Nuclear Station demonstrate the demand for skilled engineers to be present in the region.

With continued record investment in infrastructure from all three levels of government, we recognize the need to expand post-secondary education opportunities to meet the current and future demands of our sector.

We know that students appreciate the opportunity to stay and work in the communities where they are educated, the communities they've called home over the course of their studies. At WSP we have over 3,300 staff and 10 offices in the GTA, including a large office in Whitby. Our global reach and expertise combined with a significant local footprint allows us to offer graduates local, regional and global opportunities. We are consistently searching for talented individuals at all experience levels and hire hundreds of staff each year in the GTA alone.

With future expansion plans for Durham Region, and the continued need to operate and maintain the infrastructure assets we create, a civil engineering program at Ontario Tech would provide this opportunity for hundreds of students in the decades to come. This would be beneficial to a firm such as ours who needs a growing pipeline of new graduates to support our growth.

Durham Region has a bright future ahead of itself. Introducing a new civil engineering program to Ontario Tech University would help support the Region's continued growth and prosperity for the future.

Sincerely,



Danny Rosanova, M.Eng, P.Eng

Senior Vice President

Greater Toronto Area Market Leader

WSP in Canada

Appendix K - Courses Mapped to the Program FocuS

Course	Sustainability	Resilience	AI Applications	Energy
CIVE 2200U – Structural Analysis		✓		
CIVE 3100U – Soil Mechanics and Hydrogeologic Engineering		✓		
ENGR 3150U Artificial Intelligence and Machine Learning			✓	
CIVE 3200U - Indeterminate Structures and Steel Design	✓			
CIVE 3300U - Materials and Sensor Technology	✓	✓	✓	
CIVE 3400U - Principles of Transportation Engineering	✓			✓
CIVE 3600U - Introduction to Geotechnical Engineering		✓		
CIVE 3700U - Infrastructure Systems and Sustainability	✓	✓		✓
CIVE 3800U - Municipal Engineering Design	✓	✓		
CIVE 4200U - Intelligent Transportation Systems			✓	
CIVE 4300U - Highway Design	✓			
CIVE 4500U - Digital Water Infrastructure			✓	
CIVE 4600U - Environmental Design of Waste Disposal	✓			✓
CIVE 4700U – Data Science in Geotechnical Eng'g			✓	
CIVE 4800U - Hydrology				✓
CIVE 4850U - Environmental Hydraulics Design		✓		
CIVE 4900U - Building Sustainability	✓			✓
CIVE 4950U - Digital Project Delivery	✓		✓	

REVIEWERS' REPORT FOR NEW PROGRAMS

Reviewers' Report on the Proposed Bachelor of Engineering (Honours) Program in Civil Engineering at Ontario Tech University

Dr. Leon Wegner, P.Eng.
Department of Civil, Geological, and Environmental Engineering
University of Saskatchewan

Dr. Rishi Gupta, P.Eng.
Department of Civil Engineering,
University of Victoria

1. OUTLINE OF THE REVIEW

Please indicate whether this review was conducted by desk audit or site visit. For those reviews that included a site visit, please indicate the following:

- Who was interviewed
- What facilities were seen
- Any other activities relevant to the appraisal

This report is based on the "New Undergraduate Program proposal" dated June 4, 2026 along with all the appendices (A through K). In addition, the in-person site visit took place June 24-25th, 2026 as per the agenda (see Appendix 1). The agenda also includes the list of attendees at each meeting. Appendix 2 provides details of the laboratory facilities visited.

2. EVALUATION CRITERIA

NOTE: Reviewers are asked to provide feedback on each of the following Evaluation Criteria (Quality Assurance Framework 2021, Section 2.1.2).

2.1 Program Objectives

- Clarity of the program's objectives
- Appropriateness of degree nomenclature given the program's objectives
- Consistency of the program's objectives with the institution's mission and academic plans

The objectives of the proposed program are articulated in Sections 1 and 2 of the proposal. In addition to equipping graduates with a strong foundation in core Civil Engineering disciplines, the program seeks to emphasize sustainable and resilient infrastructure and to integrate modern computational modelling techniques, particularly AI applications. In this respect, the objectives are clear. However, it became apparent during the visit that another emphasis of the program will be on energy infrastructure, given the institution's proximity to nuclear facilities and the focus of other programs offered in the Faculty of Engineering and Applied Science (FEAS). This emphasis does not come through in the proposal. It is recommended that the energy emphasis be stated as part of the objectives, along with the rationale, and that the energy infrastructure content be clearly identified in the curriculum.

The degree nomenclature, indicating a degree in Civil Engineering, is appropriate, as is the identification of the options (i.e., Management or Co-operative Education) in the degree title.

The mission of Ontario Tech University is clearly stated in Section 3 of the proposal, and the consistency of the program's objectives with this mission is described well. The reference in the

proposal to alignment with industry priorities was confirmed by the Provost during the visit, who referred to being a "market driven" institution. However, the proposal does not refer to the institution's academic plans. It is recommended that a reference to the strategic plan be included along with an explanation of how the program's objectives are connected to the plan.

The university has seen substantial growth in enrollment in most FEAS programs in recent years. During the on-site visit, plans to increase the number of students at the university from 14,000 to 18,000 in a few years, and to substantially increase the number of students in the FEAS were articulated due to strong industry demand. Both the Provost and senior FEAS leadership confirmed that resources follow enrollment, which provides impetus to introduce new programs and increase student numbers where there is demand. Ontario Tech University is said to be one of the few schools in the province that has a balanced budget due to good fiscal management practices. In addition, the university is aligned with the province's strategic priority of producing graduates with engineering, health, and cyber security degrees. Reference to this information could strengthen the proposal.

Positive Aspects:

- Strong support for the program from senior administration.
- Strong alignment of program objectives with the institution's mission, academic plans, and provincial priorities.
- Strong demand for the program.

Recommendations:

- Clearly state the intended emphasis on energy infrastructure as part of the objectives and explain how this emphasis relates to the mission, academic plans, and provincial priorities.
- Refer directly to the institution's strategic plan and enrollment plan and explain how the program's objectives align with these.
- Explain how the program's objectives relate to provincial priorities.

2.2 Program requirements

- Appropriateness of the program's structure and the requirements to meet its objectives and program-level learning outcomes
- Appropriateness of the program's structure, requirements and program-level learning outcomes in meeting the undergraduate or graduate Degree Level Expectations
- Appropriateness of the proposed mode(s) of delivery to facilitate students' successful completion of the program-level learning outcomes
- Ways in which the curriculum addresses the current state of the discipline or area of study

The backbone of the proposed curriculum is similar to many other Civil Engineering programs, and as such is designed to meet the objective of equipping graduates with a strong foundation in core Civil Engineering disciplines. More novel core courses in Artificial Intelligence and Machine Learning, Materials and Sensor Technologies, Infrastructure Systems and Sustainability, Intelligent Transportation Systems, and Railway Track Design clearly target some of the other objectives of the program. The proposal could be strengthened by clarifying where the proposed emphases of the program (i.e., sustainability, resilience, AI applications, energy focus) appear throughout the curriculum, and not only in these novel courses. It is recommended that the learning objectives listed in each of the existing course outlines and new course proposals (Appendix E) be reviewed to

ensure these emphases are clearly apparent throughout the program. A map/chart summarizing where the related content appears in the program might be useful for this.

Appendix B is a good summary of the relationships between course content, program-level learning outcomes (PLOs), and Degree Level Expectations (DLEs). In addition to referring to this appendix in Section 7 of the proposal, an explanation of how to interpret the table would be helpful. The mapping of PLOs to the DLEs should be explained and some commentary on the adequacy of coverage of the PLOs and DLEs throughout the program is recommended. In addition, it appears that there may be some errors in the mapping of PLOs and DLEs to specific courses. A careful review of the mapping table in Appendix B is recommended to identify and fix any errors. Some examples include the following:

- How are software tools used (PLO3) in the application of knowledge (DLE3) in CIVE 2100U (Geology)?
- How is solving design problems (PLO2) in the application of knowledge (DLE3) incorporated into math, physics, and chemistry courses?
- How are communication (DLE4), autonomy & professionalism (DLE6) and teamwork (PLO4) incorporated into MECE 2230U (Statics) and CIVE 3100U (Soil Mechanics)?
- How are limits of knowledge (DLE5) and alternative outlooks (PLO6) part of CHEM 1800U, CIVE 2100U (Geology)?

The proposed modes of delivery are appropriate and are designed to facilitate successful achievement of the PLOs. Hands-on laboratory experiences and collaborative problem-solving opportunities are positive aspects of the proposed program, as is the two-part capstone design course, which provides an opportunity for a multi-disciplinary design experience. The co-op option is well-subscribed and well-supported in the existing programs within the FEAS, and there is every indication that this option will also be a successful feature in the Civil Engineering program.

The novel courses listed in the first paragraph of this section are examples of ways in which the curriculum addresses the current state of the discipline. The proposed program is unique among Civil Engineering programs in this respect. The elective courses provide further opportunities to address the current state of the discipline. Direct reference to these courses could be made to strengthen the proposal in terms of how they address the current state of the discipline. In addition, although the proposal refers to “research-informed course content and instructional approaches” (p. 11), a few examples of this would also help.

Positive Aspects:

- Incorporation of novel courses that address the current state of Civil Engineering.
- Hands-on laboratory experiences and collaborative problem-solving opportunities.
- Availability of the Co-op and Management options.

Recommendations:

- Clearly identify where the proposed emphases of the program (i.e., sustainability, resilience, AI applications, energy focus) appear throughout the curriculum.
- Review Appendix B to identify and fix errors in mapping course content to PLOs and DLEs.
- Clarify the requirements to complete the Railway Engineering Specialization as they relate to the Civil Engineering program by referring to Appendix D.

2.3 Program requirements for graduate programs only

- Clear rationale for program length that ensures that students can complete the program level learning outcomes and requirements within the proposed time
- Evidence that each graduate student in the program is required to take a minimum of two-thirds of the course requirements from among graduate-level courses
- For research-focused graduate programs, clear indication of the nature and suitability of the major research requirements for degree completion

N/A

2.4 Assessment of teaching and learning

- Appropriateness of the methods for assessing student achievement of the program-level learning outcomes and degree level expectations
- Appropriateness of the plans to monitor and assess:
  i. The overall quality of the program
  ii. Whether the program is achieving in practice its proposed objectives
  iii. Whether its students are achieving the program-level learning outcomes
  iv. How the resulting information will be documented and subsequently used to inform continuous program improvement

The methods for assessing student achievement, as indicated in the mapping table in Appendix B, are generally appropriate (e.g., courses that have a communication component include a presentation and/or project report as assessment methods). However, Section 8 of the proposal does not refer to this appendix. It is recommended that a reference to the appendix be added, along with an explanation of how the assessment methods are suited to particular PLOs and DLEs.

The PLOs align well with the twelve Graduate Attributes (GAs) required for accreditation by the Canadian Engineering Accreditation Board (CEAB). The FEAS appears to have an effective Continual Improvement (CI) process that measures and assesses whether graduates are achieving the Graduate Attributes. This process is expected to be effective for ensuring the overall quality of the Civil Engineering program and whether the students are achieving the PLOs. In addition, the proposal refers to a "data-driven approach to track program success," which involves the tracking and evaluation of metrics. It is recommended that the proposal explicitly identify what metrics are used to track program success and whether program objectives are being achieved in practice.

The proposal refers briefly to the Engineering Course Information System (ECIS) as a repository for course and GA data. However, it became clear during the visit that the ECIS is the "backbone" of the CI process—a software tool that was developed in-house and is used to collect data and generate visual displays of the GA data. This is the kind of tool that many Engineering schools in Canada would like to have access to for their own CI processes. It is recommended that a more detailed explanation of the ECIS be added to the proposal, along with how it is unique and effective.

Positive Aspects:

- The PLOs have been designed to align with the GAs required by the CEAB.
- The CI process is already in place in the FEAS and can be easily implemented in the proposed program.
- The ECIS system for collecting and tracking GA data is an excellent tool. Ontario Tech University was ahead of its time in developing this tool.

Recommendations:

- Add a reference to Appendix B in section 8, along with an explanation of how the assessment methods are suited to particular PLOs and DLEs.

- Explicitly state the metrics to be used to track program success.
- Provide more details about the ECIS and identify its uniqueness.

2.5 Admission requirements

- Appropriateness of the program's admission requirements given the program's objectives and program-level learning outcomes
- Sufficient explanation of alternative requirements, if applicable, for admission into a graduate, second-entry or undergraduate program, e.g., minimum grade point average, additional languages or portfolios, and how the program recognizes prior work or learning experience

The admission requirements are identical to those of other engineering programs in the FEAS and are appropriate for all engineering disciplines. Since the first year of the proposed program is common with other engineering programs, common admission requirements are appropriate.

The proposal refers to "recognizing prior work and learning experiences" for transfer students and mature applicants. To avoid the possible interpretation of this statement to include prior non-academic experience, it is recommended that the transfer requirements be clearly stated, indicating how credit for transfer courses is assessed.

Positive aspects:

- The proposed program will share a common first year with all other engineering programs, so incorporating the new program into the admission process will be seamless.

Recommendations:

- Clarify how credit for transfer courses is assessed.

2.6 Resources for all programs

Given the program's planned /anticipated class sizes and cohorts as well as its program-level learning outcomes:

- Participation of a sufficient number and quality of core faculty who are competent to teach and/or supervise in and achieve the goals of the program and foster the appropriate academic environment
- If applicable, discussion/explanation of the role and approximate percentage of adjunct and part-time faculty/limited term appointments used in the delivery of the program and the associated plans to ensure the sustainability of the program and quality of the student experience
- If required, provision of supervision of experiential learning opportunities
- Adequacy of the administrative unit's planned utilization of existing human, physical and financial resources, including implications for the impact on other existing programs at the university
- Evidence that there are adequate resources to sustain the quality of scholarship and research activities produced by students, including library support, information technology support, and laboratory access
- If necessary, additional institutional resource commitments to support the program in step with its ongoing implementation

The proposal indicates that six new faculty members will be required to successfully deliver the new program, including five tenured and tenure-track (TTT) faculty members and one teaching faculty (TF) member. These numbers were confirmed during the on-site visit. TTT faculty members

are expected to teach four courses per year, which initially will include primarily undergraduate lecture courses (although some teaching relief is provided in their first year), but will eventually include graduate courses and capstone supervision when these courses are introduced. The TF faculty member is expected to teach seven courses per year. These faculty are to be hired over a three-year period, with the intention that they be available to cover new courses as they are introduced. When fully implemented, the new program will include 24 new courses (16 core + 8 elective), introduced over a three-year period, with most of the required new courses coming online in years two and three. When accounting for teaching release for new faculty, the additional workload associated with developing new courses, graduate course teaching and capstone supervision, it is not obvious how the six new faculty members will have the capacity to cover the entire program. At the same time, new sections will be required in a number of (possibly 11) existing courses in the FEAS, which are expected to be taught by existing faculty members. Again, it is not obvious how many new sections will be required and whether existing faculty have the capacity to teach these. It is recommended that a detailed plan be added that clearly explains how the number of new faculty will meet the additional teaching requirements associated with the new courses. In addition, the number of new sections required in existing courses should be clearly identified along with an explanation of how these will be covered by existing faculty members without exceeding their capacity.

The proposed program includes a substantial number of laboratory-based learning opportunities, which will require additional technician support, teaching assistants, teaching lab spaces, and capital equipment. The proposal indicates the need for one additional Engineering Technician to support the laboratory components. Since the technicians in the FEAS are not dedicated to specific labs, there is some flexibility as to how the team of technicians can be deployed to cover all the lab requirements. This is a positive aspect of the management of resources. The proposal indicates that four new undergraduate teaching labs will be required, which will be added to the pool of teaching laboratory spaces that are currently centrally managed. It is recommended that more specifics be provided about what each of the new teaching labs will be used for and where they will be located, both initially (before the new building is commissioned) and more permanently. In addition, because Civil Engineering graduate students will only become available after a few years, it is recommended that the delayed availability of subject matter expert teaching assistants to support technical staff be identified as an issue in the proposal and a plan for how this will be addressed should be provided. Further, it is recommended that a list of capital equipment required for the new teaching labs be prepared, along with the estimated cost and timing of purchases.

The administrative, learning resources, and academic advising staff consulted during the in-person visit were excellent and had high morale. There is a strong sense of collegiality and a team approach to carrying out their work. Some expressed support for and even excitement at the prospect of supporting the new program. They have the sense that the upper administration understands the impact of introducing a new program with additional students on their workload, but the provision of required resources is delayed process so they may not become available when first needed.

It appears that several of the support units have the capacity to handle the additional workload associated with the new program, including Counselling and Accessibility, library, and IT Services. The library and IT services are well-equipped to provide the necessary resources to support the new program, including licenses for new software required by the Civil Engineering program. Additional human resources could be required for administrative support, in the co-op office, and

for academic advising. It is recommended that a more detailed explanation of the capacity of the existing staff to carry the additional workload be provided, so that a better understanding of the staffing needs associated with the new program becomes apparent. The proposal was not clear about which department will administer the new program; this should be clarified.

The academic advising team has introduced a number of programs to support students, including an early alert system to identify students in need of assistance, a peer mentoring program, AI-based math support, and an online booking system, among others.

Many of those consulted during the in-person visit referred to plans for a new building that is to be built following a public-private partnership model that would not require provincial funding. It is anticipated to be ready by 2029. There is a high level of confidence that this will happen. As space is already an issue (some instruction currently takes place in temporary facilities), the introduction of the new program will only exacerbate the need for both lecture and laboratory spaces.

Positive Aspects:

- Central management of the engineering technical staff and teaching laboratory spaces provides flexibility on the use of these resources.
- Current lab spaces are well maintained and organized.
- Excellent support staff with high morale.
- High level of confidence that a new building will be built and available as early as 2029.

Recommendations:

- Add a detailed plan that clearly explains how the number of new faculty will meet the additional teaching requirements associated with the new courses.
- Clarify the number of new sections that will be required in existing courses and explain how these will be covered by existing faculty members without exceeding their capacity.
- Provide more specific information about what each of the new teaching labs will be used for and where they will be located, particularly before the new building is commissioned.
- Identify the delayed availability of subject matter expert teaching assistants to support technical staff as an issue and present a plan for how this will be addressed.
- Provide a list of capital equipment required for the new teaching labs, along with their locations, the estimated cost, and timing of purchases.
- Provide a more detailed explanation of the capacity of the existing staff and whether this is sufficient to carry the additional workload associated with the new program.
- Identify which department will administer the proposed program and whether existing administrative resources in that department are sufficient to support the program. Explain the longer-term plan for the creation of a separate department as enrollment increases, if applicable.
- While the current philosophy at Ontario Tech University is to keep teaching and research equipment separate, for the proposed Civil Engineering program, creative protocols may be required to share the equipment to avoid duplicating equipment that require space and are expensive (e.g. servo-hydraulic universal testing machines).

2.7 Resources for graduate programs only

Given the program's planned /anticipated class sizes and cohorts as well as its program-level learning outcomes:

- Evidence that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation, and foster an appropriate intellectual climate

- Where appropriate to the program, evidence that financial assistance for students will be sufficient to ensure adequate quality and numbers of students
- Evidence of how supervisory loads will be distributed, in light of qualifications and appointment status of the faculty

N/A

2.8 Quality and other indicators

- Evidence of quality of the faculty (*e.g.*, qualifications, funding, honours, awards, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the program and commitment to student mentoring)
- Any other evidence that the program and faculty will ensure the intellectual quality of the student experience

NOTE: Reviewers are urged to avoid using references to individuals. Rather, they are asked to assess the ability of the faculty as a whole to deliver the program and to comment on the appropriateness of each of the areas of the program (fields) that the university has chosen to emphasize, in view of the expertise and scholarly productivity of the faculty.

We have no concerns about the quality of the existing faculty. New faculty are required with expertise in the various sub-disciplines of Civil Engineering to ensure that the new program can meet its objectives.

3. EQUITY, DIVERSITY, INCLUSION, AND DECOLONIZATION

Please comment on any consideration of the principles of equity, diversity, inclusion, and decolonization in the new program.

As is the case for most engineering schools, female student enrollment is low in the existing engineering programs at Ontario Tech University. The introduction of a new Civil Engineering program may be an opportunity to attract more female students by highlighting certain aspects of the new program (e.g., sustainable infrastructure, environmental engineering, AI applications, etc.).

Several resources for women faculty in the FEAS were mentioned during the visit. Among these, the “Women in Research” council appears to be unique, and faculty spoke highly of it. In combination with other resources, this group could be a promotional feature to attract new women faculty members.

Although resources are available for Indigenous students on campus, these students seldom self-declare so it is difficult to appropriately plan for the required resources.

FEAS leadership and staff demonstrated a good understanding of the constraints and barriers related to local demographics, socio-economic conditions, and the large number of first-generation students, and are sensitive to the associated needs.

<u>Positives Aspects</u>:

- There exists a demonstrated appreciation of the constraints/barriers related to local demographics, socio-economic conditions, and the large number of first-generation students.
- The “Women in Research” council is a unique feature at Ontario Tech University.

Recommendations:

- Emphasize the unique aspects of the Civil Engineering program in recruitment efforts to attract new female students.
- Emphasize the unique "Women in Research" group in the proposal and as a feature to attract new women faculty for the Civil Engineering program.

4. OTHER ISSUES

- Please highlight any unique curriculum or program innovation, creative components, or significant high-impact practices
- Please identify any other issues that may not be covered above

Innovative aspects of the proposed program include its unique combination of sustainability, energy infrastructure, and the integration of AI tools, built on a foundation of a sound Civil Engineering curriculum. The focus on Railway Engineering is also unique and addresses a particular regional industry demand.

5. SUMMARY AND RECOMMENDATIONS

Please provide a summary of your conclusions and include a numbered list of each of your recommendations.

NOTE: The responsibility for arriving at a recommendation on the final classification of the program belongs to the Appraisal Committee. Individual reviewers are asked to refrain from making recommendations in this respect.

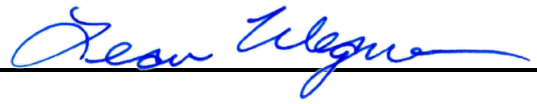
The introduction of a Civil Engineering program in the FEAS is a logical next step for Ontario Tech University given the high demand for Civil Engineers and the strong support of regional industry partners. The proposed program provides a solid foundation in the technical aspects of Civil Engineering while featuring a unique combination of sustainability, energy infrastructure, AI applications, and Railway Engineering that distinguishes it from other Civil Engineering programs. It takes advantage of existing resources and systems already in place for the other engineering programs in the FEAS, including (among others) a common first year, centralized systems for managing space and human resources, and a strong system for continual improvement for accreditation.

The following are considered strengths of the proposal:

- Centralized resource management (teaching lab space and technical support, administrative staff team cross-coverage, IT support).
- Proximity of the university to nuclear facilities as a basis for the focus on energy infrastructure.
- The unique combination of sustainability, energy infrastructure, AI applications, and Railway Engineering.
- Strong support from senior university administration.
- Strong stakeholder support.
- Strong demand for the program.
- Existing robust system for continual improvement for accreditation. The FEAS was ahead of its time in developing the ECIS system to support the continual improvement process.

Recommendations have been provided throughout each section of the report. The following recommendations warrant particular emphasis:

- Add a reference in Section 8 to the assessment mapping table in Appendix B and briefly explain how the identified assessment methods align with and support the evaluation of specific Program Learning Outcomes (PLOs) and Degree Level Expectations (DLEs).
- Clearly state the intended emphasis on energy infrastructure as part of the objectives and explain how this emphasis relates to the mission, academic plans, and provincial priorities.
- Clearly identify where the proposed emphases of the program (i.e., sustainability, resilience, AI applications, energy focus) appear throughout the curriculum.
- Add a detailed plan that clearly explains how the number of new faculty will meet the additional teaching requirements associated with the new courses.
- Clarify the number of new sections that will be required in existing courses and explain how these will be covered by existing faculty members without exceeding their capacity.
- Provide more specific information about what each of the four new teaching labs will be used for and where they will be located, particularly before the new building is commissioned.
- Provide a list of capital equipment required for the new teaching labs, along with their locations, the estimated cost, and timing of purchases.
- Provide a more detailed explanation of the capacity of the existing staff and whether this is sufficient to carry the additional workload associated with the new program.
- Identify which department will administer the proposed program and whether existing administrative resources in that department are sufficient to support the program. Explain the longer-term plan for the creation of a separate department as enrollment increases.
- Emphasize the unique aspects of the Civil Engineering program in recruitment efforts to attract new female students.

Signature: 

Date: Friday, July 3, 2026

Signature: 

Date: Thursday, July 2, 2026

Appendix 1: Visit Schedule

Site Visit Agenda for New Programs
Civil Engineering - Faculty of Engineering and Applied Science
June 24 - 25, 2026

Reviewers:

Dr. Leon Wegner, University of Saskatchewan
Dr. Rishi Gupta, University of Victoria

Day 1 – Wednesday, June 24, 2026

Time	Location	Details	People
8:30-9:00	ERC 3023	Welcome Institution Overview (Continental Breakfast Provided)	**Dr. Lori Livingston**, Provost & Vice-President, Academic **Dr. Hossam Kishawy**, Dean, Faculty of Engineering & Applied Science (FEAS) **Dr. Scott Nokleby**, Associate Dean, Faculty of Engineering & Applied Science **Darryl Papke**, Quality Enhancement Analyst
9:00-9:45	ERC 3023	Program Overview Agenda Overview Self-Study Overview (Continental Breakfast Provided)	**Dr. Hossam Kishawy,** Dean, Faculty of Engineering & Applied Science **Dr. Scott Nokleby**, Associate Dean, Faculty of Engineering & Applied Science **Dr. Ashraf El Damatty,** Professor and Chair, Western University **Dr. Dima Jawad,** Senior Teaching Professor
BREAK - 15 Minutes			
10:00-11:15	ERC 3023	Meeting with faculty members	**Dr. Daniel Hoornweg**, Associate Professor **Dr. Dima Jawad**, Senior Teaching Professor **Dr. Ghaus Rizvi**, Professor **Dr. Martin Agelin-Chaab**, Professor **Dr. Meaghan Charest-Finn**, Assistant Professor **Dr. Murat Aydin**, Associate Teaching Professor **Dr. Remon Pop-Iliev**, Professor **Shahid Hidayat**, Associate Teaching Professor
11:15-12:00	ERC 3023	Meeting with staff members	**Kailey Tinline**, Faculty Services Assistant **Kelly Crocker**, Accreditation and Academic Planning Specialist **Kenzie Fuselli**, Budget Officer **Shari Martin**, Administrative Coordinator **Stephan Anthonipillai**, Departmental Administrative Assistant (MME)

LUNCH - 1 Hour (lunch provided)			
1:00-2:00	ERC 3023	Tour of Campus	**Hidayat Shahid**, Assistant Dean Engineering Laboratories **Govind Rehal**, Manager - Technical Services
2:00-3:00	ERC 3023 and/or Google Meet https://meet.google.com/gsq-dyzz-mgm	Meeting with Learning Resources Panel	Student Learning Centre • **Sarah Stokes**, Manager - Student Support Co-op, Experiential Learning and Career Development • **Lindsay Coolidge**, Executive Director, **Amanda Miller**, Manager, **Candace Chard,** Co-op & Internship Officers Counselling and Accessibility • **Monica Jain**, Director, Student Support Services, **Yonae Kelly**, Manager, Student Accessibility, **Marose Bellehumeur**, Manager, Student Mental Health Library • **Kate Gibbings**, Librarian IT Services • **Mike Prasad**, Technical Support Analyst Natasha Coburn (IT) attended
BREAK - 15 Minutes			
3:15-4:00	ERC 3023	Conclusion and summary of the Day Plans for the following day	**Dr. Hossam Kishawy,** Dean, Faculty of Engineering & Applied Science **Dr. Scott Nokleby**, Associate Dean, Faculty of Engineering & Applied Science **Dr. Ashraf El Damatty,** Professor and Chair, Western University **Dr. Dima Jawad,** Senior Teaching Professor

5:30pm - Dinner at Milestones (75 Consumers Dr, Whitby ON L1N 9S2)

Day 2 - Thursday, June 25, 2026

Time	Location	Details	People
9:00-9:30	ERC 3023	Welcome Day 2 Overview (Continental breakfast provided)	**Dr. Hossam Kishawy,** Dean, Faculty of Engineering & Applied Science (FEAS) (Regrets) **Dr. Scott Nokleby**, Associate Dean, FEAS Kelly Crocker attended
9:30-10:15	ERC 3023	Meeting with Academic Advising	**Kerry Morrison**, Manager, Academic Advising **Theeben Jagatheesan**, Manager, First-year Academic Advising **Bryan Lee**, Senior Academic Advisor **Domenic Cirone**, First-Year Academic Advisor (Regrets) **Rachel Yost**, Senior Academic Advisor **Sunya Akhtari**, First-Year Academic Advisor
BREAK - 15 Minutes			
10:30-11:30	ERC 3023	Reviewer's collaboration	Only the external reviewers present
11:30-12:30	ERC 3023	Formal conclusion and discussion of issues **Lunch Break** **(lunch provided)**	**Dr. Hossam Kishawy**, Dean, Faculty of Engineering & Applied Science **Dr. Scott Nokleby**, Associate Dean, Faculty of Engineering & Applied Science **Dr. Ashraf El Damatty,** Professor and Chair, Western University **Dr. Dima Jawad,** Senior Teaching Professor
12:30-1:00	ERC 3023	Final summary and conclusion	**Dr. Hossam Kishawy**, Dean, Faculty of Engineering & Applied Science **Dr. Scott Nokleby**, Associate Dean, Faculty of Engineering & Applied Science **Dr. Ashraf El Damatty,** Professor and Chair, Western University **Dr. Dima Jawad,** Senior Teaching Professor

Appendix 2: Campus and lab tour details

This audit was conducted by an in-person site visit. The various facilities visited during the campus tour are (tour given by Assistant Dean Engineering Laboratories (a PEng) and Gobind Rehal, manager technical services):

1. Radiation lab (Observations: low level radiation- so no special PPE required, students test various rock samples collected from across campus in a laboratory, the team noted 3 fumehoods in this laboratory).
2. Wind lab (Observations: intent to convert this into a fluids lab, a new set-up acquired to perform 6-7 experiments in fluids using augmented reality, generally 24 students attend a lab in one set, there were 8 other duplicate set-ups to allow small groups of 4-5 students to perform experiments during a lab, there was one fumehood in this lab and according to tech staff the fumehoods are inspected in house at least once a year by the University).
3. Energy simulation lab (Observations: used for the energy program- houses solar panels, this lab doubles up for the Railway engineering program with 6 duplicate models of railway tracks to perform experiments on controls, the building visited has 7 teaching labs).
4. Ontario power generation building (Observations: houses a machine shop which in intended to be moved into another location, the machine shop to be converted into the structures lab for the proposed civil engineering program, there is provision already to house a UTM, there are some 3D printers in this lab).
5. Thermodynamics lab, aka Combustion and HVAC (Observations made: well situated flammable cabinets were housed in many labs, there were heat pumps and other equipment for student experiments).
6. Automotive components (Observations: to be converted into the hydraulics lab for the proposed civil engineering program, this is a wet lab making it suitable for the hydraulics experiments).
7. Materials and solid mechanics (Observations: two tabletop 100kN UTMs are existing in this lab- set up for tensile test and another for flexure, there are around 15 tabletop frames to conduct educational experiments for shear and bending, the duplication of equipment allows for 30 student groups to be in the lab at the same time).
8. Engineering innovation lab (Observations: several 3D printers, soldering station, etc. available for students to use)
9. CAD lab (Observations: has space for 60 students, students bring their own laptops, but there are 60 PCs available at the stations).
10. Robotics lab (Observations: this is intended to be converted into a civil lab, decision on what lab this will become is yet to be made).
11. Electric machines and communications (Observations: this is intended to be converted into a civil lab, decision on what lab this will become is yet to be made).
12. ACE (Observations: this facility is predominantly not for teaching, 60% use is commercial and 40% is for research, some possibility to conduct teaching, houses the climatic wind tunnel, a very state of the art facility, has a dynamometer as well and a shake table, managed by an executive director who reports to the VPR).
13. Student design studio (Observations: 1 machinist manages this- currently position is vacant and is being filled).
14. Classrooms (Observations: these are in the Science building, the largest classroom has a capacity of 250 students. Proposal to have a classroom with around 400 students in the new building, also plans to have a classroom with Active Learning space).

Faculty Response to the External Review for the

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BACHELOR OF ENGINEERING (HONOURS) –
CIVIL ENGINEERING

Submitted By:

Ashraf El Damatty & Dima Jawad

July 2026

Dr. Hossam Kishawy, Dean

July 2026

Introduction

The external reviewers have provided positive feedback on the proposed Civil Engineering program. The external reviewers have made some recommendations to further improve the program. We have addressed all of them and updated the proposal accordingly. Below is a summary of the reviewers' comments and our response.

Summary of Recommendations and Faculty Responses

- *Restate the recommendations summarized in the external reviewers' report and provide the Program's comments and responses*
- *The Dean should then provide summative comments/responses from an overarching Faculty perspective for each recommendation and program response*

Recommendation 1
Add a reference in Section 8 to the assessment mapping table in Appendix B and briefly explain how the identified assessment methods align with and support the evaluation of specific Program Learning Outcomes (PLOs) and Degree Level Expectations (DLEs).

Program's Response

Section 7 was modified by additional information that describes the PLO development, curriculum and assessment mapping exercises, and provides a reference to the PLO mapping document included in Appendix B. The section briefly explains how the curriculum is aligned with the Program Learning Outcomes (PLOs) and Degree Level Expectations (DLEs), how student achievement is assessed throughout the program, and how the mapping document should be interpreted. Section 8 further explained the assessment methods.

In addition, the curriculum mapping table in Appendix B was comprehensively reviewed and revised to improve the alignment between courses, Program Learning Outcomes (PLOs), Degree Level Expectations (DLEs), and assessment methods. Course-to-PLO mappings were refined to remove unsupported or unnecessary mappings and ensure appropriate coverage of all learning outcomes across the curriculum. The assessment methods were updated to include laboratory reports where applicable, and the Introduced (I), Reinforced (R), and Mastered (M) designations were reviewed to ensure a logical progression of student learning. In addition, explanatory notes, legends, and instructions were added to improve the readability and interpretation of the mapping table, while consistency in course titles, PLO notation, and assessment terminology was verified throughout.

Dean's response
The Dean agrees with the Program's response.

Recommendation 2
Clearly state the intended emphasis on energy infrastructure as part of the objectives and explain how this emphasis relates to the mission, academic plans, and provincial priorities.

Program's Response

The proposal has been revised to explicitly recognize energy infrastructure as an integral component of sustainable and resilient civil infrastructure systems. Additional text has been added to the Academic Rationale (section 2) and the Mission, Vision, and Strategic Mandate Agreement (section 3) to clarify how this emphasis aligns with Ontario Tech University's mission and provincial priorities related to sustainable infrastructure and infrastructure modernization. No curricular changes were required, as energy infrastructure is already encompassed within the program's broader infrastructure focus.

Also, a new table that maps the curriculum to the program's focus areas including energy infrastructure has been introduced in Appendix L

Dean's response
The Dean agrees with the Program's response.

Recommendation 3
Clearly identify where the proposed emphases of the program (i.e., sustainability, resilience, AI applications, energy focus) appear throughout the curriculum.

Program's Response

The Civil Engineering curriculum is designed to reflect the current state of the discipline by integrating foundational civil engineering knowledge with emerging technologies, contemporary industry practices, and evolving societal and infrastructure needs. The curriculum provides comprehensive coverage of the core areas of civil engineering, including structural, geotechnical, transportation, environmental, and municipal engineering, while incorporating modern approaches to sustainable and resilient infrastructure design and management.

A distinctive feature of the program is its focus on sustainable infrastructure, resilience, digital technologies and AI applications in civil engineering, and energy infrastructure, which are intentionally integrated throughout the curriculum. Advanced and specialized courses expose students to contemporary topics such as Artificial Intelligence and Machine Learning, Intelligent Transportation Systems, Digital Water Infrastructure, Data Science in Geotechnical Engineering, and Digital Project Delivery. In addition, modern railway engineering represents a unique curricular component that addresses the growing demand for expertise in sustainable transportation infrastructure and distinguishes the program from comparable offerings.

A above revised paragraph has been incorporated within the proposal in section 7, under '*The unique curriculum or program innovations or creative components in this program*' that discusses the focus areas of the program and the approach to introduce them the program.

In addition, the following civil engineering courses: *CIVE 2200U - Structural Analysis, CIVE 3100U - Soil Mechanics and Hydrogeologic Engineering, CIVE 3200U - Indeterminate Structures and Steel Design, CIVE 3300U - Materials and Sensor Technology, CIVE 3400U - Principles of Transportation Engineering, CIVE 3600U - Introduction to Geotechnical Engineering, CIVE 3700U - Infrastructure Systems and Sustainability, CIVE 3800U - Municipal Engineering Design, CIVE 4200U - Intelligent Transportation Systems, CIVE 4300U - Highway Design, CIVE 4500U - Digital Water Infrastructure, CIVE 4600U - Environmental Design of Waste Disposal, CIVE 4700U - Data*

Science in Geotechnical Engineering, CIVE 4800U - Hydrology, CIVE 4850U - Environmental Hydraulics Design, CIVE 4900U - Building Sustainability and CIVE 4950U - Digital Project Delivery course learning outcomes have been identified to clearly emphasize sustainability, resilience, AI application and Energy within the civil engineering program.

Course	**Sustainability**	**Resilience**	**AI Applications**	**Energy**
CIVE 2200U - Structural Analysis	-	3. Recognize the sources of loads on structures and calculate design static wind and snow loads.	-	-
CIVE 3100U - Soil Mechanics and Hydrogeologic Engineering	-	8. Understand how soil and groundwater conditions influence the design, construction, and performance of municipal systems.	-	-
CIVE 3200U - Indeterminate Structures and Steel Design	8. Assess the impacts of engineering materials' life-cycle to identify options that reduce carbon footprint while meeting structural performance requirements.	-	-	-
CIVE 3300U - Materials and Sensor Technology	2. Understand the carbon emissions associated with cement production, CO_2 storage potential, and low-carbon alternatives.	6. Understand the fundamental principles of modern sensing, data acquisition, and post-processing techniques used in infrastructure monitoring systems.	8. Apply mathematical models and engineering tools to analyze sensor data and assess system performance.	-
CIVE 3400U - Principles of Transportation Engineering	6. Assess the social and environmental impacts of transportation such the impact of transportation corridors on urban form and suburban sprawl and impact of alternative vehicles, fuels and transit systems.	-	-	6. Assess the social and environmental impacts of transportation such the impact of transportation corridors on urban form and suburban sprawl and impact of alternative vehicles, fuels and transit systems.
CIVE 3600U - Introduction to Geotechnical Engineering	-	7. Understand and evaluate the effects of climate change on soil behavior, particularly changes in pore water pressure and consolidation settlement associated with rising groundwater levels.	-	-
CIVE 3700U - Infrastructure Systems and Sustainability	4. Understand and apply critical infrastructure standards and regulations. 6. Understand the overall environmental impacts of infrastructure systems.	3. Analyze key vulnerabilities in infrastructure systems as they relate to a changing climate. 5. Understand and apply mechanisms to increase the resilience of infrastructure.	-	1. Identify the key inputs and provisioning of energy, transportation and municipal infrastructure. 2. Understand and design the interrelated aspects of infrastructure systems such as energy within transportation systems.

CIVE 3800U - Municipal Engineering Design	4. Identify the effect of urbanization on stormwater runoff. 8. Assess the impact of climate change on water availability and scarcity and its implications for water resources management and infrastructure planning.	5. Apply stormwater management practices, including detention facilities, flood routing, and mitigation of urban development impacts on water quantity and quality. 8. Assess the impact of climate change on water availability and scarcity and its implications for water resources management and infrastructure planning.	-	-
CIVE 4200U - Intelligent Transportation Systems	-	-	6. Implement, simulate, and analyze intelligent transportation systems through software and coding.	-
CIVE 4300U - Highway Design	7. Assess the wildlife-vehicle interaction and incorporate mitigation strategies, such as wildlife crossing systems, to minimize ecological disruption and improve roadway sustainability.	-	-	-
CIVE 4500U - Digital Water Infrastructure	-	-	4. Develop and evaluate digital solutions such as soft sensors, predictive models, and advanced process control strategies. 6. Integrate smart sensing, data analytics, and modeling approaches to monitor, evaluate, and optimize the performance of water infrastructure systems.	-
CIVE 4600U - Environmental Design of Waste Disposal	4. Analyze environmental impacts of waste disposal and interpret relevant regulatory frameworks and approval processes.	-	-	2. Describe and evaluate landfill types, leachate characteristics, and alternative waste treatment methods, including waste-to-energy technologies. 6. Estimate landfill gas generation and composition and understand management and recovery strategies.

CIVE 4700U - Data Science in Geotechnical Engineering	-	-	1. Prepare and format data appropriately for a variety of machine learning models. 2. Select and implement suitable machine learning algorithms, including decision trees, support vector machines, and deep neural networks, for engineering applications. 3. Explain key concepts in machine learning, data science, big data, and artificial intelligence, and differentiate among them. 4. Critically evaluate the assumptions, limitations, and performance of different machine learning models. 5. Apply machine learning techniques for prediction of engineering variables using relevant environmental and sensor data. 6. Apply machine learning image analysis methods to classify engineering images, identify key features, and develop models for detecting and locating damage or defects.	-
CIVE 4800U - Hydrology	-	-	-	6. Analyze subsurface storage of compressed air (e.g., compressed air, CO_2, and hydrogen) and evaluate gas and liquid behavior in porous media and assess their impacts on groundwater flow and pressure.
CIVE 4850U - Environmental Hydraulics Design	-	7. Assess the impact of climate change on flood frequency and magnitude.	-	-
CIVE 4900U - Building Sustainability	1. Explain the principles of sustainable building design, including passive design strategies. 8. Interpret and apply green building regulations and	-	-	5. Assess passive cooling strategies and their effectiveness in reducing building energy demand. 6. Estimate building thermal loads and energy

	standards in the context of sustainable design.			consumption using established engineering methods. 7. Utilize building energy simulation tools to model, analyze, and optimize building performance.
CIVE 4950U - Digital Project Delivery	8. Employ Digital Twins and digital technologies for sustainable operation and maintenance of buildings and infrastructure assets.	-	7. Integrate Internet of Things (IoT) with Digital Twins for real-time monitoring and management of construction projects.	-

Dean's response
The Dean agrees with the Program's response.

Recommendation 4
Add a detailed plan that clearly explains how the number of new faculty will meet the additional teaching requirements associated with the new courses. Clarify the number of new sections that will be required in existing courses and explain how these will be covered by existing faculty members without exceeding their capacity.

Program's Response
The Faculty is initially hiring 5 Tenure/Tenure-Track (TTT) and 1 Teaching Faculty (TF) for the program. The nominal teaching load for TTTs is four courses and for TFs is seven courses, as such, a total of 27 courses are available to be taught. There are 16 core courses that need to be developed for the program along with seven electives for a total of 23 courses that will eventually need to be developed. It should be noted that the electives will be developed in a phased approach and not all of them will be offered in the initial years of the program. Further, as there are no graduate programs in Civil Engineering, faculty members' teaching loads will be at the undergraduate level. As such, there is sufficient capacity for the faculty hired for the program to develop the new courses. Note, any new courses in the program will be developed by TTT and TF faculty members, not sessionals.

With respect to the number of new sections of existing courses, the service courses offered by the Faculty of Science (CHEM, MATH, and PHY courses) and the Faculty of Social Science and Humanities (ENGR 1050U and liberal studies electives) are already offering 1-2 additional sections of each of the service courses as part of the growth of all the engineering programs at Ontario Tech. The increased enrolment caused by the Civil Engineering program is included already in these additional section offerings. Similarly for the engineering courses shared with other programs, the Faculty is already experiencing increased growth in these courses due to increasing enrolment in other programs. With the addition of the Civil Engineering program, the need for an additional section of these courses, e.g., ENGR 1015U, ENGR 1025U, ENGR 1200U, MANE 2220U, MECE 2230U, etc., will be required. The Faculty has existing teaching capacity in the other Departments to handle this increase.

Dean's response
The Dean agrees with this response. It is recognized that the initial faculty members will each be developing a number of new courses, but this is nothing out of the ordinary anytime a new program starts and has been the case for all new programs in the Faculty since 2003.

Further, as the program grows, the Faculty will be requesting additional faculty members to support this program as well as the other programs with shared courses. The Provost has made it clear that resources follow student enrolment, so as the Faculty's programs continue to grow, additional TTT and TF hires will be made.

Recommendation 5
*Provide more specific information about what each of the four new teaching labs will be used for and where they will be located, particularly before the new building is commissioned. Provide a list of capital equipment required for the new teaching labs, along with their locations, the estimated cost, and timing of purchases***.**

Program's Response
As per the proposal there will be three labs for the program. These labs will be housed in the existing OPG Engineering building. These labs are not reliant on the new building being built. The specifics are:

ENG1035 and ERC2054 - Fluid Mechanics and Hydraulics Laboratories:
The existing Fluid Mechanics lab in ERC2054 will be used for some experiments and the Hydraulics Laboratory will be set up in ENG1035.

ENG2030, ENG2035, and ENG1045 - Solid Mechanics, Materials, and Structural Laboratories:
ENG2030 and ENG2035 will be used for light-duty, tabletop structural and material testing equipment. ENG1045 will be configured as a Structural Laboratory for heavy-duty testing.

ENG3050: Geotechnical Laboratory:
ENG3050 will be configured as the Geotechnical Laboratory.

Specifics about the equipment to be purchased for the labs will be determined by the faculty members hired for the program who are subject matter experts. The equipment will be purchased in a phased approach that aligns with program delivery in Years 2-4, with the equipment being purchased the year prior to allow adequate time for installation, commissioning, and lab development.

Dean's response
The Dean agrees with the response. As part of the exercise in designing the new building, existing spaces within the OPG Engineering building are being reconfigured and reallocated, including moving the machine shop, to optimize space utilization and create space for the Civil Engineering labs.

Recommendation 6
Provide a more detailed explanation of the capacity of the existing staff and whether this is sufficient to carry the additional workload associated with the new program.

Program's Response
As noted in the proposal, one technician to support the new Civil Engineering program will be hired. Lab support in the Faculty is handled centrally and, with the additional hire and the existing lab staff, there is sufficient capacity to support the program. With respect to the

administrative staff, there is sufficient existing capacity in the Faculty to support the program.

Dean's response
The Dean agrees with the response. As noted in the proposal, if the student enrolment exceeds the projections, a request will be made to the University for further technical and administrative staff support.

Recommendation 7
Identify which department will administer the proposed program and whether existing administrative resources in that department are sufficient to support the program. Explain the longer-term plan for the creation of a separate department as enrollment increases.

Program's Response
The program will initially reside in the Department of Energy and Nuclear Engineering. As the smallest department in the Faculty, it has adequate administrative resources to support the program in the initial years.

Dean's response
The Dean agrees with the response. As noted in the proposal, if the student enrolment exceeds the projections, a request will be made to the University for further administrative staff support.

Recommendation 8
Emphasize the unique aspects of the Civil Engineering program in recruitment efforts to attract new female students.

Program's Response
The Faculty of Engineering and Applied Science has a very strong Engineering Outreach program. As part of Engineering Outreach's activities, they offer programming that targets female youth as well as other underrepresented groups including Indigenous and Black youth. Programming is currently being developed and updated to highlight the new Civil Engineering program.

Dean's response
As noted, the Engineering Outreach program in the Faculty is active in recruiting female students and will do so for the new Civil Engineering program.

Suggested Revisions for the Proposal following External Review

- *Program to list all suggested revisions to the proposal*
- *For each suggested revision, the Dean should include a comment indicating whether the revision will proceed. If the revision will not proceed, please indicate a rationale*

Recommendations are incorporated in the revised proposal. Please see 'Summary of changes made to proposal of external report'.

Summary of Changes Made to the Proposal Following External Review

List all revisions to the proposal and appendices, noting the Section number from the document. Include this form with the final proposal.

- Section 7 was modified by additional information that describes the PLO development, curriculum and assessment mapping exercises, and provides a reference to the PLO mapping document included in Appendix B.
- Section 9 was reviewed and revised to improve the alignment between courses, Program Learning Outcomes (PLOs), Degree Level Expectations (DLEs), and assessment methods. Course-to-PLO mappings were refined to remove unsupported or unnecessary mappings and ensure appropriate coverage of all learning outcomes across the curriculum. The assessment methods were updated to include laboratory reports where applicable, and the Introduced (I), Reinforced (R), and Mastered (M) designations were reviewed to ensure a logical progression of student learning.
- The proposal has been revised to explicitly recognize energy infrastructure as an integral component of sustainable and resilient civil infrastructure systems. Additional text has been added to the Academic Rationale (section 2) and the Mission, Vision, and Strategic Mandate Agreement (section 3) to clarify how this emphasis aligns with Ontario Tech University's mission and provincial priorities related to sustainable infrastructure and infrastructure modernization.
- A new appendix has been added (Appendix K - Courses Mapped to the Program Focus) that maps the curriculum to the program's focus areas including sustainability, resilience, AI Applications and energy.
- Appendix F was updated to clarify how the planned hiring of five TTT and one TF faculty members will support the teaching requirements of the new Civil Engineering program.
- Section 11.4 was updated to provide additional details on teaching labs, including their locations, intended uses, and confirmation that they are not dependent on the new building. Also added the planned phased purchase of lab equipment to align with program delivery in Years 2-4.

UNDERGRADUATE STUDIES COMMITTEE REPORT

ACTION REQUESTED:

Recommendation	☒
Decision	☐
Discussion/Direction	☐
Information	☐

DATE: **20 October 2026**

FROM: **Faculty of Science**

SUBJECT: **Major Program Modification – Bachelor of Science (Hons) in Biological Science – Biochemistry specialization**

COMMITTEE MANDATE:
In accordance with the Undergraduate Studies Committee (USC) Terms of Reference, USC has the responsibility "to examine proposals for new undergraduate degree programs and major changes to existing programs and to recommend their approval, as appropriate, to the Academic Council".

MOTION FOR CONSIDERATION:
That USC hereby recommends to Academic Council the approval of the Major Program Modification to the Bachelor of Science (Hons) in Biological Science to introduce a new Biochemistry Specialization.

BACKGROUND/CONTEXT & RATIONALE:
The Faculty of Science is proposing the introduction of a new Biochemistry specialization within the Honours Biological Science program by integrating existing courses from Chemistry, Biology, Physics, and Mathematics and adding five (5) new courses specifically designed for Biochemistry specialization:

- Third-year Biochemistry Seminar Course (Winter term)
- Fourth-year Laboratory Methods in Biochemistry (Winter term)
- Fourth-year Special Topics in Biochemistry Course (Winter term)
- Fourth-year Thesis project (Fall and Winter terms)

The specialization will offer students a range of experiential learning opportunities that integrate theoretical knowledge with practical hands-on application. Through a series of biology and chemistry laboratory courses, students will develop essential biochemical skills and techniques.

In their fourth year, students may also complete a research-based project, working under faculty supervision to investigate real-world biochemical questions.

RESOURCES REQUIRED:
Faculty members will be required to deliver the proposed new courses, with Teaching Assistant support provided as needed based on enrollment. Classroom/lecture and lab space will be required to support course delivery. The Dean has been involved in the planning of the proposed specialization and has approved the associated resource requirements and costs.

TRANSITION AND COMMUNICATION PLAN:
Incoming students are able to enroll in this specialization from inception. Current students can add the specialization after the first year, provided they have the necessary prerequisites for upper year specialization specific courses. Current students will be encouraged to meet with Academic Advising to see if they are able to switch to the new specialization.

CONSULTATION AND APPROVAL:
- ✓ Curriculum Committee: 25 August 2026
- ✓ FSci Faculty Council: 1 September 2026
- Undergraduate Studies Committee (Recommendation): 20 October 2026
- Academic Council (Approval): 24 November 2026

The Dean of Science contacted all Deans to inform them of the addition of the new specialization and to enquire about any potential issues or opportunities. The Faculty of Health Sciences identified opportunities for students in the specialization to access select Health Sciences courses as electives, with the potential for expanded interdisciplinary offerings in the future.

Discussion with prospective students through recruitment activities, including the Ontario Universities' Fair and Open House events, has identified biochemistry as an area of strong student interest that is not currently offered at Ontario Tech University. The Student Recruitment team has similarly reported consistent inquiries from prospective students about biochemistry programming during high school recruitment visits and other recruitment events.

NEXT STEPS:
Pending the recommendation of USC, this change will be presented to Academic Council for approval. If approved, it will be included in the 2027-2028 Academic Calendar.

SUPPORTING REFERENCE MATERIALS:
Major Program Modification: Biological Science - Biochemistry specialization

New course(s): BIOL 3081U, BIOL 4071U, BIOL 4072U, BIOL 4510U, BIOL 4520U

UNDERGRADUATE STUDIES COMMITTEE REPORT

ACTION REQUESTED:

Recommendation	☐
Decision	☒
Discussion/Direction	☐
Information	☐

DATE: **20 October 2026**

FROM: **Faculty of Health Sciences**

SUBJECT: **Minor Program Adjustment – Medical Laboratory Science – Bridge – Advanced Diploma in Biotechnology**

COMMITTEE MANDATE:
In accordance with the Undergraduate Studies Committee (USC) Terms of Reference, USC has the responsibility "to approve minor program adjustments and report them to Academic Council for information."

MOTION FOR CONSIDERATION:
That USC hereby approves the Minor Program Adjustment to the Medical Laboratory Science – Bridge – Advanced Diploma in Biotechnology program to add two Research Applications courses that were inadvertently missed in a Major Program Modification approved last year.

BACKGROUND/CONTEXT & RATIONALE:
This update adds Research Applications HLSC 4996U and HLSC 4997U, which were inadvertently omitted from the Major Program Modification approved by Academic Council on January 27, 2026.

Students in Year 4 may complete either MLSC 4400U and MLSC 4401U or HLSC 4996U and HLSC 4997U to satisfy the program requirements.

RESOURCES REQUIRED:
No additional resources are required.

TRANSITION AND COMMUNICATION PLAN:
Both courses are routinely offered, and students may choose which course pair to complete based on their clinical practicum setting.

Prior to beginning their clinical practicum, all students receive a comprehensive overview of practicum requirements. The Clinical Practicum Coordinator will communicate the course options and associated requirements, ensuring that students are aware of this change. This course option has already been approved for the MLS General program, and students in that program, who follow a timeline similar to that of Bridge students, have already been informed. The program will also communicate this information through the MLS Communications Hub to ensure all affected students are aware of the available course options.

CONSULTATION AND APPROVAL:
- ✓ Curriculum Committee: 19 May 2026
- ✓ Faculty Council: 3 June 2026
- Undergraduate Studies Committee (for approval): 20 October 2026
- Academic Council (for information): 24 November 2026

NEXT STEPS:
Pending the approval of USC, this change will be presented for information to Academic Council and included in the 2027-2028 Academic Calendar.

SUPPORTING REFERENCE MATERIALS:

- Minor Program Adjustment proposal

ACADEMIC COUNCIL
UNDERGRADUATE STUDIES COMMITTEE (USC)

Minutes of the Public Session of the June 16, 2026 Meeting
via Videoconference
9:00 a.m. - 10:06 a.m.

Undergraduate Studies Committee Agenda & Materials 2025-2026

Present:

Mary Bluechardt, Chair	Ana Duff	Holly MacPherson
Martin Agelin-Chaab	Christian Elia	Janet McCabe
Wendy Barber	Tyler Frederick	Kimberley McCartney
Jessica Boswell	Randy Fortier	Jemma Tam
Nicola Crow	Andrew Hogue	Adam Wingate

Staff and Guests:
Kirstie Ayotte (Interim Recording Secretary)

1. **Call to Order and Land Acknowledgement**
The Chair called the Public Session of the Undergraduate Studies Committee (USC) Meeting to order at 9:00 a.m. and J. Tam provided their personal Land Acknowledgement.

2. **Approval of Agenda**
The Chair advised that Agenda Item 7.1, Public Minutes of the May 19, 2026 Meeting, would be removed from the Consent Agenda and considered separately under Agenda Item 7 following a request by a Member.

Upon a motion duly made by A. Hogue and seconded by J. Tam, the USC Agenda was approved as amended, including approving and receiving the Consent Agenda and its contents as amended.

3. **Chair's Remarks**
The Chair thanked Members who participated in Convocation ceremonies and reflected on the significance of celebrating student achievement alongside graduates and their families. They noted the positive response from families to the enhanced opportunities for engagement following the ceremonies and emphasized the important role faculty and staff play in supporting student success.

The Chair also acknowledged the work of the Committee over the 2025-2026 academic year, noting that USC had approved twenty-three Minor Program Adjustments, recommended sixteen

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Major Program Modifications and two New Program Proposals to Academic Council, as well as considered a number of academic policy matters. The Chair thanked Committee Members for their contributions throughout the year and extended best wishes for a restful and restorative summer.

4. Major Program Modification (Recommendation)

4.1 Frazer Faculty of Education: Bachelor of Education (Primary/Junior and Intermediate/Senior)* (M)

C. Elia provided an overview of the proposed Major Program Modification, which responds to provincial legislation requiring all Bachelor of Education programs in Ontario to transition to a twelve-month model beginning in May 2027. He advised that the University's existing accelerated program structure enabled the Faculty to adapt while preserving key curriculum and practicum components.

Members discussed implementation considerations and provincial requirements. C. Elia noted that the proposal was developed through extensive consultation within the Faculty and maintains the program's distinctive strengths while ensuring compliance with provincial legislation. Kudos was expressed to all involved both for expediting this process and all the hard work required to achieve this.

Upon a motion duly made by made by C. Elia and seconded by A. Wingate, that USC hereby recommends to Academic Council the approval of the Major Program Modification to the Bachelor of Education programs to revise the program structure from four (4) accelerated semesters to three (3) accelerated semesters in order to align with provincial legislation mandating all Bachelor of Education programs in the province to move from a two-year model to a twelve-month format.

5. Minor Program Adjustment (Approval)

5.1 Faculty of Health Sciences: Bachelor of Health Sciences – Kinesiology – Advanced Entry for Fitness and Health Promotion Graduates* (M)

J. McCabe provided an overview of the proposed revision to the Advanced Entry pathway for Fitness and Health Promotion diploma graduates. She explained that the previously approved pathway had been designed primarily for Durham College graduates and that the proposed change would increase transfer credit flexibility for students applying from other institutions, thereby creating a more equitable admissions pathway while ensuring students complete required Ontario Tech University courses.

Upon a motion duly made by R. Fortier and seconded by A. Hogue, that USC hereby approves the Minor Program Adjustment to update the transfer credit block for the Advanced Entry option for Fitness and Health Promotion Diploma students.

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6. Cyclical Program Review (Approval)

6.1 18 Month Follow-Up Report: Bachelor of Information Technology – Networking and Information Technology Security* (M)

K. McCarney advised that the report represented the final 18-Month Follow-up Report under the previous Institutional Quality Assurance Process (IQAP) framework. She explained that the report provides an update on progress made in relation to action items identified through the cyclical program review process and noted that many initiatives remain ongoing as part of the program's continuous improvement activities.

Discussion included questions regarding governance processes under the revised IQAP framework and the manner in which future follow-up reporting would be reviewed and communicated through governance bodies. K. McCartney confirmed that future cyclical program review follow-up reporting would be reviewed through the revised IQAP procedures and that any subsequent changes arising through governance review processes would continue to be reported back to relevant bodies as appropriate.

Upon a motion duly made by R. Fortier and seconded by A. Hogue, that USC hereby approves the 18-Month Follow-up Report from the Bachelor of Information Technology – Networking and Information Technology Security Cyclical Program Review, as presented.

7. Consent Agenda* (M)

The Chair confirmed that the contents of the Consent Agenda, with the exception of Item 7.1, were approved and received under Agenda Item #2.

7.2 Minor Curricular Changes: (I)

7.2.1 Course Change
KINE 4200U

N. Crow noted that the Committee was approaching the scheduled end time of the meeting and recommended a brief extension to allow sufficient time to consider the item that had been removed from the Consent Agenda.

Upon a motion duly made by R. Fortier and seconded by J. Tam, that the meeting be extended for an additional five minutes.

Item Pulled from Public Consent Agenda:

7.1 Public Minutes of the May 19, 2026 Meeting* (M)

A Member raised a proposed amendment to the draft minutes relating to wording within the discussion on the IQAP Procedures. Following discussion, Members agreed to amend the paragraph to acknowledge that the Member who had been asking questions identified they had more questions. The approved amendment revised the paragraph to read:

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"The Member who had been asking questions identified they had more questions. The Chair again acknowledged and noted both the written and verbal responses to questions that had been received, including those submitted in writing, and asked other Committee Members if there were any new questions that remained outstanding or any further comments they would like to add, with no additional questions or comments forthcoming from other Members."

The same Member also raised concerns regarding the recording of voting results within the minutes and suggested that future minutes include the number of votes cast in favour of motions where opposition or abstentions are recorded. N. Crow advised that the current practice complies with the Democratic Rules of Order and University governance practice, noting that the minutes appropriately record attendance, opposition votes, abstentions, and the outcome of the motion. N. Crow further advised that the Secretariat was satisfied that the minutes accurately reflected the decisions of the Committee. No amendment to the minutes was accepted in relation to this matter with N. Crow indicating that the matter would be taken under advisement.

Upon a motion duly made by R. Fortier and seconded by J. Tam, the Public Minutes of the May 19, 2026 Meeting were approved as amended.

8. Termination

There being no other business, and upon a motion to terminate by R. Fortier, the USC Meeting terminated at 10:06 a.m.

Kirstie Ayotte, Interim Recording Secretary

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