

# Common First-Year Engineering Curriculum Agreement

## 1.0 Objectives

The Common First-Year Engineering Curriculum (CFYEC) is intended to prepare graduates for transfer into second-year Engineering at any of the post-secondary institutions shown as signatories to this document. This program (with its appropriate appendix) contains the common first-year expectations for each of the receiving institutions, and, for clarity, are shown in this document as course blocks in the areas of physics, chemistry, engineering design, computer programming, mathematics, and communication skills.

The key objectives include:

- **Improving** efficiencies at sending institutions.
- **Assisting** smaller institutions in developing an engineering focus, creating opportunities for **community engagement** and **partnerships**.
- **Improving** the student learning environment (e.g. stronger cohort development, student supports.)
- **Enhancing** quality reporting for accreditation processes.

## 2.0 Agreement Terms and Conditions

The terms and conditions of this agreement have been informed by:

- Pre-existing course-by-course articulation agreements (via the BC Council on Admissions and Transfer - BCCAT).

And applies to:

- Students who have completed fully and successfully the common first-year engineering curriculum at one of the signatory institutions.

As a good faith agreement between all its signatories.

## 2.1 Good Faith Agreement

A Good Faith Agreement is an agreement that outlines a sincere effort and purpose of undertaking an action or activity with an aim or objective to achieve good results or outcomes. With respect to the Common First-Year Engineering Agreement, good faith can be described as just and honest conduct, which should be expected of all parties in their dealings, one with another and with third parties. Good faith requires that each party perform their respective obligations and enforce their rights and responsibilities honestly and fairly.

## 2.2 Obligations

Through their signatures on this agreement, each primarily receiving institution agrees to:

- Accept, as equivalent to its first-year engineering curriculum, the curriculum stated in Section 3.0 of this document, including the appropriate Appendix.
- Post information on its website regarding CFYEC and its signatory sending institutions and promote the CFYEC option when meeting with high schools.
- Endeavour to provide access to information regarding the CFYEC and its signatory sending institutions to any applicant denied direct entry into an engineering program or school. Such data to be provided in compliance with the BC Freedom of Information and Privacy Act (FOIPA) and other relevant statutes.
- On an annual basis, endeavour to provide details (in comparison to direct-entry students) on progression and academic success for students from a sending institution to that sending institution. Such data to be provided in compliance with FOIPA and other relevant statutes.
- Facilitate course-by-course articulation of the CFYEC through BCCAT for each signatory primarily sending institution upon request by said primarily sending institution.

Through their signatures on this agreement, each primarily sending institution agrees to:

- Encapsulate the CFYEC as a recognized credential (e.g. a certificate)
- Provide information on its website regarding the CFYEC and its signatory receiving institutions and promote the CFYEC option when meeting with high schools.
- Ensure that instructors for designated engineering content within the CFYEC (typically those covering engineering science, engineering design, project work, and/or an introduction to the engineering profession) have a professional engineering credential (e.g. P. Eng, P.L. Eng.) allowing for practice of engineering in Canada. Instructors for each applicable course to be provided as part of the institution's annual articulation report.
- Articulate course-by-course transfer of the CFYEC through BCCAT.
- Reasonably accommodate a request by receiving institutions to participate in at least one university transfer information session to provide details about their engineering programs.
- Reasonably accommodate requests by receiving institutions to document AU counts and topics in CEAB workbooks or equivalent, and collect a limited amount of graduate attribute data
- Ensure students within the CFYEC program are aware that they must follow all application procedures and policies of the receiving institution, including applying for admission and submitting post-secondary and/or high school academic transcripts.

## 2.3 Agreement Review

This agreement will be reviewed **annually** at the BCCAT Engineering Articulation committee meeting after it has been formally adopted.

## 2.4 Agreement Withdrawal

Signatory institutions may give notice that they wish to withdraw from the agreement at any time; this notice must be served to the BCCAT Engineering Articulation Committee chair, who is responsible for communicating the intent to agreement signatories. The withdrawal will be effective no less than two years from the date the notice is served.

## 2.5 Change Requests

Change requests must be presented at the annual BCCAT Engineering Articulation Committee and approved by **all** the signatory primarily receiving institutions and a **2/3** majority of signatory primarily sending institutions. Such change requests ought not be unreasonably refused and will typically be effective no less than **18 months** from the date of that meeting.

## 3.0 Curriculum

Curriculum is one component of the CFYEC: Transfer students must complete the required curriculum under the conditions specific for each receiving institution. The transfer conditions (to be subsequently referred to as the pathway) are specified in the applicable Appendix.

The CFYEC will consist of ten core courses plus up to two course options specific to the signatory receiving institution and identified in their applicable Appendix. Assuming the pathway condition is met, the collection of ten course courses plus up to two institution specific courses will be treated as equivalent to the first-year engineering curriculum at that signatory receiving institution. By completing the curriculum in adherence to the pathway condition, students are expected to obtain the required skills and knowledge to transfer to second year and be successful.

General Requirements of the CFYEC:

- P.Eng, P.L.Eng., or equivalent designations in other Canadian professional engineering associations for designated engineering classes

Specific learning outcomes include the ability to:

- Demonstrate an understanding of the scientific method and apply it to critically solve problems;
- Demonstrate proper laboratory techniques, including the use of appropriate equipment and instrumentation;
- Develop original designs to solve engineering problems;
- Collect, analyze, and interpret laboratory data, and draw sound conclusions;
- Effectively communicate ideas and project results;
- Demonstrate an ability to work well independently and in groups;
- Engage in informed debate on topics related to technology; and
- Effectively apply scientific/engineering concepts towards subsequent coursework.

To add clarity, the learning outcomes from the certificate have been packaged in course units. Sending institutions need not organize these learning outcomes exactly as specified, although to aid course-by-course articulation between sending and receiving institutions, it is recommended that these course packages be maintained as much as possible.

Course packages are presented in terms of a minimum number of hours of instruction (lecture:lab) per week over a standard term length of 12 weeks. As tutorial hours are not typical for sending institutions, this time has not been specified. This term length describes the effective instructional time and excludes statutory holidays and any relevant final exam period. Terms that differ from this standard ought to be pro-rated to ensure that same minimum coverage (both in terms of learning outcomes and time) is maintained. Learning outcomes are elaborated for each course package in Appendix A, while the approximate course-by-course transferability of these units to each institution is shown in their appropriate Appendix.

#### *Required Course Packages*

##### ***Differential Calculus - CALC I (4:0)***

Limits, continuity, intermediate value theorem; Differentiation; Taylor polynomials and special Taylor series; Curve sketching

##### ***Integral Calculus - CALC II (4:0)***

Integration; Numerical Integration (including the Trapezoidal Rule); Improper integrals: evaluation and convergence estimates; Differential equations (first-order linear) with applications.

##### ***Engineering Chemistry - CHEM I\* (4:3)***

A survey of general first year chemistry. Topics include thermochemistry, atomic and molecular structure, chemical bonding, solution and phase equilibria, equilibrium, chemical thermodynamics, and electrochemistry.

For those institutions not offering CHEM I\*, the following combinations would be acceptable:

- CHEM I and CHEM II (BSc standard first-year chemistry curriculum)
- CHEM I and a one-credit course such that the latter course includes the topics of thermochemistry, thermodynamics, and electrochemistry

##### ***Computer Science I - CSCI I (3:2)***

A first-year course in computer science using the 'C' programming language. Topics include structured programming, top-down program design, procedures, and an introduction to dynamic data structures.

##### ***University Writing - ENGL I (3:0)***

An introduction to critical thinking and reasoning, academic writing, and research skills, consistent with the conditions and expectations students encounter as readers and writers at university.

***Engineering Design I - ENGR I (2:0:2)***

An introduction to the principles of engineering design, engineering drawing and sustainable practice. This knowledge will be applied to practical projects to be undertaken by teams of students. ENGR I is to be instructed by a P.Eng, P.L.Eng., or equivalent designations in other Canadian professional engineering associations.

***Engineering Design II - ENGR II (2:2)***

Principles and applications of engineering design, engineering drawing, and sustainable practice. This knowledge will be applied to practical projects to be undertaken by teams of students. ENGR II is to be instructed by a P.Eng, P.L.Eng., or equivalent designations in other Canadian professional engineering associations.

***Matrix Algebra - LALG I (4:0)***

An examination of vectors, matrices and their operations, linear systems, determinants, linear dependence and independence, eigenvalues, and eigenvectors, and applications.

***Fundamental Physics I - PHYS I (4:3)***

A calculus-based course. Topics such as kinematics and dynamics of particles, energy and momentum, rotational and periodic motion.

***Fundamental Physics II - PHYS II (4:3)***

A calculus-based course. Topics include waves, electricity and magnetism, geometrical and physical optics, quantization and nuclear processes.

***Course Options (up to two of following may be required)<sup>1</sup>******Complementary Studies – CS I (3:0)***

CS courses can be broadly defined<sup>2</sup> as studies in humanities, social sciences, arts, management, engineering economics and communication that complement the technical curriculum.

***Computer Science II – CSCI II (4:2)***

Continues to coverage of CSCI I and includes: Techniques, methods, and tools for systematic development and maintenance of software systems and documentation; basic algorithms and data structures; and fundamental concepts of object-oriented programming. Topics include control and data abstraction, modularization, abstract data types, layers of abstraction, information hiding, separation of concerns, type checking, program design, separate compilation, software libraries, techniques for the development of high-quality software components, program understanding.

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<sup>1</sup>Specific optional courses needed and transfer pathway requirements are articulated within the Appendix for each receiving engineering school (Appendix B to G)

<sup>2</sup><https://engineerscanada.ca/regulatory-excellence/examination-syllabi/complementary-studies>

**Technical Writing - ENGL II (3:0)**

An introduction to business and technical communication skills with a focus on documents (such as letters and reports) and presentations. Topics may include planning, outlining, summarizing, presenting data, handling references, and editing. The course comprises several practical assignments, including a formal report and an oral presentation.

**Engineering Mechanics – PHYS III (4:0)**

An introductory mechanics course covering the statics and dynamics of particles and rigid bodies, using vector analysis and differential/integral calculus to solve problems related to forces, motion, work, and energy.

## 4.0 Admissions and Transfer

Although this agreement does not mandate a specific minimum admission standard for primarily sending institutions, it does provide the following guidance on evaluating incoming students:

- English 12 (or equivalent) with a minimum grade of B
- Physics 12 with a minimum grade of C+; Applicants missing Physics 12 or equivalent are encouraged to apply and will be reviewed on a case-by-case basis.
- Chemistry 12 with a minimum grade of C+; Applicants missing Chemistry 12 or equivalent are encouraged to apply and will be reviewed on a case-by-case basis.
- Pre-Calculus 12 with a minimum grade of B
- Recommended: Calculus 12 (if available); Programming 12 (if available)

## 5.0 Minimum Articulation Unit/Graduate Attribute Delivery

The following Accreditation Units (AU) and Graduate Attributes (GA) are determined to be the **minimum** delivery outcomes from the CFYEC, based 12 weeks of instruction with 10-weeks of labs. The AU/GA total has been broken down into lecture/lab hours/week, as well as hour counts in the areas of Math (M), Natural Science (NS), Complementary Studies (CS), Engineering Science (ES), and Engineering Design (ED). Definitions for each of these areas can be found in Appendix G.

**Table 1. Prescribed AU Outcomes claimed by the Common First-Year Engineering Curriculum**

Course	Cred.	Lec (hr/wk)	Lab (hr/wk)	Total AU	M	NS	M+N S	CS	ES	ED	ES+E D
CALC I	3-4	4	-	48	48		48	-	-	-	-
CALC II	3-4	4	-	48	48	-	48	-	-	-	-
CHEM I	3-4	4	3	63	-	63	63	-	-	-	-
CSCII	3-4	3	2	46	-	-	-	-	46	-	46
ENGL I	3	3	-	36	-	-	-	36	-	-	-
ENGR I	3	2	2	34	-	-	-	8.5	8.5	17	25.5
ENGR II	3	2	2	34	-	-	-	8.5	8.5	17	25.5
LALG I	3	4	-	48	48	-	48	-	-	-	-
PHYS I	3-4	4	3	63	-	63	63	-	-	-	-
PHYS II	3-4	4	3	63	-	63	63	-	-	-	-
<b>Totals</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>

Although Graduate Attributes are not prescribed by the CEAB at a first-year level, the accreditation board is looking for progression of each attribute through a students' academic studies. The CFYEC claims the following Graduate Attributes, *each at an introductory level*:

**Table 2. Prescribed GA Outcomes claimed by the Common First-Year Engineering Curriculum**

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1. A Knowledge Base of Engineering	7. Communication Skills
2. Problem Analysis	8. Professionalism
3. Investigation	9. Impact of Engineering on Society and the Environment
4. Design	10. Ethics and Equality
5. Use of Engineering Tools	11. Project Management
6. Individual and Team Work	12. Life-long Learning

Each signatory receiving institution may require additional AU/GA credits, as identified in Appendices B - G.

### 6.0 SIGNATORIES

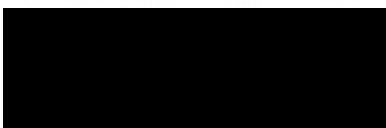
The Common First-Year Engineering Certificate is signed on behalf of:

#### 6.1 Primarily Receiving Institutions


By placing your signature, you commit your institution, as a major receiving school, to adhere to the terms of this agreement

  
 \_\_\_\_\_  
 Carol Jaeger, Associate Dean – Undergraduate Engineering Programs  
 University of British Columbia - Point Grey Campus

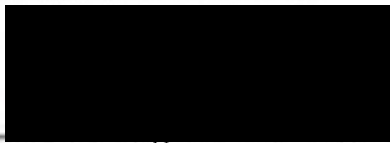
Feb 24, 2020  
 Date

  
 \_\_\_\_\_  
 Yang Cao, Associate Director of Undergraduate Studies  
 University of British Columbia – Okanagan Campus  
 REH N SAIDIQ, EXECUTIVE ASSOC. DEAN

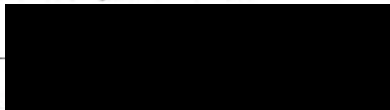
MAR 12, 2020  
 Date

  
 \_\_\_\_\_  
 Christine L. Bovis-Crossen, Provost and Vice-President Academic and Research  
 Thompson Rivers University


4/3/2020 | 16:57:44 PDT  
 Date

  
 \_\_\_\_\_  
 Lillanne Jackson, Associate Dean – Undergraduate Studies  
 University of Victoria

Apr. 22/20  
 Date

  
 \_\_\_\_\_  
 University of Northern British Columbia  
 Mark Dale, Interim Provost and Vice President, Academic

November 6, 2020  
 Date

  
 \_\_\_\_\_  
 Catherine Dauvergne, Vice-President, Academic and Provost  
 Simon Fraser University

November 2, 2021  
 Date

\*Note that signatures ported from prior version of CFYEC agreement (v1.41)

**6.2 Primarily Sending Institutions**

By placing your signature, and within two years of the stated date, you commit your institution to offering intakes to a curriculum aligned to the CFYEC, and adhering to the terms of this agreement.

[Redacted Signature]

Pouyan Mahboubi, Dean – Faculty of Arts and Sciences  
Capilano University

Feb 26, 2020  
Date

[Redacted Signature]

Digitally signed by Dr. Titi Kunkel  
Date: 2020.10.29 11:12:41 -07'00'

Titi Kunkel, Dean of Instruction – UC, Sciences, and Health Programming  
Coast Mountain College

\_\_\_\_\_  
Date

[Redacted Signature]

Alison Anderson, Dean – School of University Studies and Career Access  
College of New Caledonia

April 3, 2020  
Date

[Redacted Signature]

Robin Hicks, Vice President Academic and Applied Research  
College of the Rockies

2020 Apr 06  
Date

[Redacted Signature]

Bén Cecil, Provost and Vice-President, Academic and Students  
Langara College

02/19/2020  
Date

[Redacted Signature]

Loren Lovegreen, Vice President, Academic and Research  
Northern Lights College

03/16/2020  
Date

[Redacted Signature]

Neil Cruickshank, Dean – Arts, Science and Technology  
North Island College

08/04/2020  
Date



4/3/2020 | 16:57:44 PDT

Christine L. Bovis-Crossen, Provost and Vice-President Academic and Research  
Thompson Rivers University



24 Feb. 2020

Shirley Lew, Dean – School of Arts and Science  
Vancouver Community College

Date



9 March 2020

Henry J., Dean – Faculty of Science and Technology  
Vancouver Island University

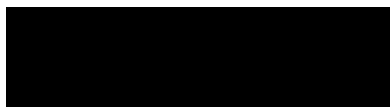
Date

Additional institutions may use the space below for their signatures.



Yvonne Moritz, Associate Vice President Education Services  
Interim Dean Science, Technology and Health  
Okanagan College

2020  
Date



Allison Alder, Dean, School of Academic Upgrading &  
Development, School of University Arts & Sciences, Mir Centre  
for Peace, Selkirk College

March 3, 2022  
Date



James Mandigo, Provost and VP Academic  
University of the Fraser Valley

June 17, 2022  
Date

\*Note that signatures above ported from prior version of CFYEC agreement (v1.41)



John Boraas, Provost and VP Education and Innovation  
Camosun College

November 5, 2024 \_\_\_\_\_

Date

\*Note that signatures above ported from prior version of CFYEC agreement (v1.511)



Amy Jeon, Dean pro tem, Faculty of Science  
Kwantlen Polytechnic University

June 10, 2025 \_\_\_\_\_

Date

\*Note that signatures above ported from prior version of CFYEC agreement (v1.512)



Thor Borgford, VP Academic and Provost  
Douglas College

January 19th, 2026 \_\_\_\_\_

Date

## APPENDIX A: Required Learning Topics/Outcomes

### *Required courses*

#### *CALC I/II*

CALC I (Differentiation) and CALC II (Integration) have been standardized for the science stream across all BC post-secondary institutions under a BCCAT TI project entitled *First-year Core Calculus*<sup>3</sup> (updated in 2013<sup>4</sup>) and the BC Transfer Guide shows the equivalent of CALC I and II are articulated across all receiving institutions on a course-by-course basis.

#### *Required Learning Topics - CALC I/II*

The first-year Core Calculus - Science Stream prescribes the following core content, which shall be the equivalent of 75% of a standard one-year calculus experience:

- Limits, continuity, intermedia value theorem
- Differentiation
  - First and second derivatives with geometric and physical interpretation
  - Mean value theorem
  - Derivatives of exp and log functions, exponential growth and decay
  - Derivatives of trigonometric functions and their inverses
  - Differentiation rules (including chain rule, implicit differentiation)
  - Linear approximation and Newton's Method
  - Optimization - local and absolute extrema and applications
- Taylor polynomials and special Taylor series (sin, cos, exp,  $1/(1-x)$ ), plus enough sequences and series to understand the radius of convergence; the concept of series and convergence, the ratio test, and how to find the radius of convergence.
- Curve Sketching
- Integration
  - Definition of the definite integral
  - Areas of plane regions
  - Average value of a function
  - Fundamental Theorem of Calculus
  - Integration techniques: Substitution (including trig substitutions), parts, tables, partial fractions
  - At least one more application of integration
- Improper integrals: Evaluation and Convergence estimates
- Separable differential equations

The first-year Core Calculus - Science Stream suggests several additional topics to cover the remaining 25% of a standard one-year calculus experience. The CFYEC suggests the additional topics to best prepare students for success in second year:

- Sequences and Series; for example, the following tests: integral, comparison, alternating series, root, and limit ratio

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<sup>3</sup><http://www.bccat.ca/pubs/calculus.pdf> (as of 16.Jul.2016) - pg 10

<sup>4</sup><http://www.bccat.ca/pubs/CoreCalcUpdate2013.pdf> (as of 12.Jun.2018)

- Polar coordinates and parametric equations (with calculus applications)
- Complex numbers

### *CHEM I\*<sup>5</sup>*

Chemistry I\* is a single course which combines the learning outcomes from both Chemistry I (CHEM I) and Chemistry II (CHEM II), the two standard chemistry courses within the first year of a Bachelor of Science program at most institutions.

#### *Required Learning Outcomes:*

- Understand the present model of atomic structure, and how it influences the periodic properties of the elements
- Understand present models of chemical bonding
- Understand how intermolecular interactions determine the properties and phases of matter
- Understand the principles of chemical thermodynamics, and how they relate to the spontaneity of chemical processes
- Know and practice proper laboratory procedures of safety and cleanliness
- Know and be proficient with basic techniques in quantitative and volumetric analysis, and spectrophotometry
- Be able to produce a properly structured laboratory report

For those institutions not offering CHEM I\*, the following combinations would be acceptable:

- CHEM I and CHEM II (Standard BSc first-year Chemistry curriculum)
- CHEM I and a one-credit course such that the latter course includes the topics of thermochemistry, thermodynamics, and electrochemistry

### *CSCI I<sub>6</sub>*

An introduction to programming is a required course by all receiving institutions although emphasis on practical applications of programming may vary. The programming language must be C or C++ and include:

#### *Required Learning Outcomes*

##### Program Comprehension

- Analyze and explain the behaviour of simple programs involving the fundamental programming constructs variables, expressions, assignments, I/O, control constructs, functions, parameter passing, and recursion.

##### Program Design and Implementation

- Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard

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<sup>5</sup>Example from D. Friesen, CHEM 150 (VIU)

<sup>6</sup>Example from S. Carruthers, CSCI 160 (VIU)

conditional and iterative structures, the definition of functions, parameter passing, constants, and enumerated types. Primitive Data Types

- Identify and describe the appropriate use of primitive data types
- Write programs that use primitive data types

Conditional and Iterative Constructs

- Choose appropriate conditional and iteration constructs for a given programming task
- Modify and expand short programs that use standard conditional and iterative control structures and functions.

Functions

- Describe the purpose of function definitions
- Describe the importance of modularization when solving problems
- Break problems up into sub-problems using functions, when writing programs

Advanced Data Structures

- Write programs that use each of the following data structures: arrays, structs, strings.
- Write programs that use pointers for dynamic memory allocation and release
- Describe the concept of dynamic data structures and their uses
- Recognize the risks of pointers.

Code Quality

- Apply consistent documentation and program style standards
- Describe the importance of consistent documentation and program style standards
- Create readable and maintainable software using conventions like documentation and program style standards

### ENGL 17

ENGL I is a standard university academic writing course historically required by all sending and receiving institutions. It typically consists of an introduction to critical thinking and reading, academic writing, and research skills consistent with the expectations of university. Within the common core context, it is *recommended* that this course be offered as a collaborative effort with ENGR I.

#### *Required Learning Outcomes*

- Analyze the rhetorical situation
- Explore technical and scientific topics
- Create effective persuasive documents
- Write effective academic prose
- Implement a structured writing process
- Create effective arguments, using appropriate evidence
- Practice the problem-solving process to develop creative and innovative solutions
- Collaborate on oral and written communication projects

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<sup>7</sup>Example from J. Eikenaar APSC 176 (UBC-O)

*ENGR I/II*

An effective engineer requires a broad understanding of a large body of expertise, separate from and independent of the sciences. The increasing emphasis of the Canadian Engineering Accreditation Board (CEAB) on graduate attributes encourages developing students' understanding of engineering design, the engineering profession, and engineers' roles in society at a much earlier point in their academic career. Much of the content for these two courses may be drawn from the textbook "Introduction to Engineering – A guide to Professional Practice in Canada" by Peter Ostafichuk and Carol Jaeger<sup>9</sup>. The relevant chapter reference is listed for each section, although supplementary material may be required for full coverage of the topic. The estimated coverage time for each topic is indicated in brackets in terms of instruction lecture and lab hours (lecture:lab).

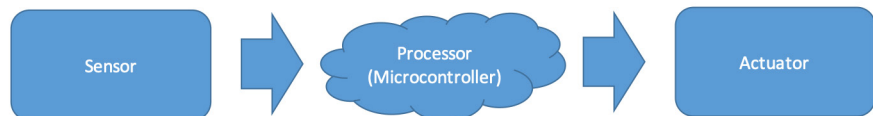
*Required Learning Outcomes*

Engineering Design (20:20 hrs)  Ostafichuk & Jaeger Chpt 4 – 9, 11, 18	<ul style="list-style-type: none"> <li>• Describe/identify tools within each Engineering Design Process step</li> <li>• Identify and engaging stakeholders</li> <li>• Identify project scope (function/constraints)</li> <li>• Integrate design considerations (e.g. environment, safety)</li> <li>• Identify and Consider risks and hazards</li> <li>• Use brainstorming and creative tools</li> <li>• Apply formal decision processes (e.g. Pugh, weighted decision matrix)</li> <li>• Build/test prototypes</li> </ul>
Sustainability (8:8 hrs)  Ostafichuk & Jaeger Chpt 12 - 14	<ul style="list-style-type: none"> <li>• Understand the three dimensions of sustainability</li> <li>• Compare Traditional vs. Sustainable Design Criteria</li> <li>• Apply life cycle assessment to a product</li> <li>• Describe the impact of human activity on health, safety, and environmental systems.</li> <li>• Suggested Instructional Activity: Case Studies</li> </ul>
Engineering Drawing (10:10 hrs)  Ostafichuk & Jaeger Chpt 10	<ul style="list-style-type: none"> <li>• Demonstrate sketching</li> <li>• Demonstrate isometric/multi-dimensional drawing</li> <li>• Use lines/angles/dimensioning in a drawing</li> <li>• Demonstrate CAD (e.g. Solidworks, 3D Fusion or similar) up to and including 3D sketching, exploded views.</li> <li>• Produce prototypes by interfacing CAD with fabrication tools (e.g. 3D printers)</li> </ul>

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<sup>9</sup>Ostafichuk, P., Jaeger, C., "Introduction to Engineering – A Guide to Professional Practice in Canada (BC Edition)", 1<sup>st</sup> Edition, Oxford University Press (2023).

Professionalism/Ethics (2:2 hrs)  Ostafichuk & Jaeger Chpt 1-3, 16	<ul style="list-style-type: none"> <li>• Describe the CEAB core competencies</li> <li>• Apply continuous improvement</li> <li>• Describe the engineering code of ethics</li> <li>• Apply ethical conflict resolution</li> <li>• Suggested Instructional Activity: Case studies</li> </ul>
Teamwork  Ostafichuk & Jaeger Chpt 17	<ul style="list-style-type: none"> <li>• Understand group dynamics theory (e.g. Tuckman model)</li> <li>• Describe models for building successful teams</li> <li>• Apply conflict resolution techniques</li> <li>• Give/receive feedback effectively</li> </ul>
Project Work (included as 10:10 workload within the topics above)  Ostafichuk & Jaeger Chpt 19	<p>Students, working in teams, follow a structured process to design a sophisticated system comprising of multi-disciplinary subsystems (e.g. electrical, mechanical, and software) and include the following characteristics:</p> <ul style="list-style-type: none"> <li>• Demonstrate progress at several milestone stages with associated technical reporting</li> <li>• Client-based (e.g. the client prescribes the scope and constraints and verifies delivery)</li> <li>• Consider regulatory constraints, the business case, stakeholder interests and environmental considerations as part of an iterative project design</li> <li>• Develop a project consisting of the following structure:</li> </ul>



### LALG I

Linear Algebra is required by all receiving institutions although it can be numbered as either a 1st or 2nd year course. It is *suggested* that MATLAB (or equivalent tool) and its application be introduced to students as part of the course content, preferably as a lab component. A typical syllabus includes:

#### *Required Learning Topics:*

- Systems of linear equations and matrices
- Matrix algebra
- Determinants
- Linear independence and bases in  $R_n$
- Linear transformations
- Eigenvalues and eigenvectors
- Applications of linear algebra

### *PHYS I/II*

Collectively, these topics shown below typically comprise of what is equivalent to the first-year physics requirements for a BSc program at most institutions. Although the actual order of topics may vary from institution to institution, all topics must be covered to fulfill the CFYEC requirements. Recommended additional topics include RLC, LC circuits, Relativity, Gravitation, or Thermodynamics (if not covered in PHYS III). Estimated coverage time for each topic is indicated in brackets in terms of instruction lecture and lab hours (lecture:lab).

#### *Required Learning Topics:*

##### Kinematics and Vectors (~8:6 hrs)

- Vectors
- Projectile Motion
- Circular Motion

##### Dynamics (Mechanics) (~24:18 - 32:24 hrs)

- Newton's Laws and Free Body Diagrams
- Friction
- Work and Energy
- Conservation Forces, Potential Energy, Work-Energy Theorem
- Rotational Kinetics, Moment of Inertia, Torque
- Rotational Dynamics
- Angular Momentum and Rolling Bodies

##### Waves and Optics (~24:18 - 32:24 hrs)

- Physical Optics - Reflection, Refraction, and Lenses
- Simple Harmonic Motion and Pendulums
- Waves, Sound, Interference, and Standing Waves, Doppler Effect
- Wave Optics - Superposition, Interference, Reflection
- Properties of EM waves, Light, and Polarization

##### Electronics (~12:9 hrs)

- DC Circuits: Ohm's Law, Kirchoff's Law
- RC Circuits
- AC Circuits

##### Quantum Physics (~4:3 hrs)

*Optional courses (up to two of the following may be required)<sup>10</sup>*

*CS I*

Complementary studies (CS) courses<sup>11</sup> are an accreditation requirement of all engineering programs in Canada. For the purposes of the CFYEC, a CS course *may* be used as one of the twelve courses, if required by the specific receiving institution (See applicable appendix). In general, CS courses can be broadly defined as studies in humanities, social sciences, arts, management, engineering economics and communication that complement the technical curriculum. Each receiving institution has its own process for approving CS courses; if applicable, this process will be described in the appropriate Appendix at the end of this document.

*CSCI II*

CSCI II follows the content of CSCI I and is a recommendation for some programs and some receiving institutions. It includes: Techniques, methods, and tools for systematic development and maintenance of software systems and documentation; basic algorithms and data structures; and fundamental concepts of object-oriented programming. Topics include control and data abstraction, modularization, abstract data types, layers of abstraction, information hiding, separation of concerns, type checking, program design, separate compilation, software libraries, techniques for the development of high-quality software components, program understanding.

*Required Learning Outcomes*

- Use a modern object-oriented programming language to define and manipulate lists, stacks, queues, trees and tables of data;
- Choose practical algorithms and data structures based on the constraints of a programming task.
- recognize when a particular choice of data structure is appropriate or ill-advised by reasoning about its efficiency in relation to a problem domain;
- reason about repetitive aspects of a computing problem, and develop appropriate recursive or iterative solutions;
- Implement abstract data types using classes and object oriented programming.
- Apply access control mechanisms to encapsulate objects.
- distinguish between overloading and overriding functions.
- reason about repetitive aspects of a computing problem, and develop appropriate recursive or iterative solutions;
- Implement, test, and debug recursive functions and procedures

---

<sup>10</sup>Specific optional courses needed and transfer pathway requirements are articulated within the Appendix for each receiving engineering school (Appendix B to G)

<sup>11</sup><https://engineerscanada.ca/regulatory-excellence/examination-syllabi/complementary-studies>

*ENGL II<sub>12</sub>*

ENGL II is an optional course required for many receiving institutions. It focusses on communicating technical information clearly and concisely, managing issues of persuasion when communicating with diverse audiences, presentation skills, and teamwork. Within the common core context, it is *recommended* that this course be offered as a collaborative effort with ENGR II.

*Required Learning Outcomes*

- Understand and apply the key concepts of organizational communication and the writing process
- Establish the purpose(s) of a written or spoken discourse
- Analyze the target audience
- Apply the various strategies and general formats used to produce appropriate business correspondence (e.g. letters, memos & e-mails)
- Describe a variety of employment search skills and prepare an effective letter of application and a functional or targeted resume
- Apply the skills of document design (e.g. effective use of layout, headings, graphics, etc.)
- Develop effective descriptive writing skills frequently used to produce lengthy documents such as process descriptions or formal reports
- Research, plan, organize and prepare formal reports. (Table of Contents, List of Figures, Executive Summary, Body [i.e. effective layout, headings and subheadings], and APA documentation and with the appropriate in-text citations)
- Research, plan, and organize information to prepare unsolicited proposals
- Prepare and deliver effective presentations

*PHYS III*

Engineering Mechanics is an optional course required for many receiving institutions. Its content is described using a common textbook – Hibbler, R.C., *Statics and Dynamics*, 13th Edition (2013) :

<i>Thermodynamics</i> <sup>13</sup>	Zeroth Law and Heat Capacity Kinetic Theory, First Law of Thermodynamics Heat Engines	
<i>Mechanics</i>	Chpt 1.1-1.6 Chpt 2.1-2.9 (excl. 2.4) Chpt 3.1-3.4 Chpt 4.1-4.10 Chpt 5.1-5.7 Chpt 6.1-6.6 Chpt 7.1-7.3	General Principles Force Vectors Equilibrium of a Particle Moments Rigid Body Structural Analysis Internal Forces

<sup>12</sup>Example from Distant Education, ENG 160 (NIC)

<sup>13</sup>Thermodynamics content is also commonly be included in CHEM I\*, PHYS I or PHYS II.

Chpt 8.1-8.4	Friction
Chpt 12.1-12.8	Kinematics
Chpt 13.1-13.6	Kinetics

Programs are welcome to use other learning material, provided it is of similar rigour to the standard text. For example, the Open Education project funded by BC Campus and led by the University of British Columbia (Mechanical Engineering) and Douglas College (Physics) provides images and a question bank; an open textbook resource, Mechanics Map, is provided through Penn State University. References to this material have been provided by Jennifer Kirkey (Douglas College) and may be found here:

<https://collection.bccampus.ca/course-packs/mechanics-for-applied-science/>

## APPENDIX B: Additional Requirements- Thompson Rivers University

### Curriculum

In addition to the core CFYEC curriculum, Thompson Rivers University requires the completion of the following courses:

- PHYS III
- ENGL II

### Minimum AU/GA Delivery Requirements

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>84</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>567</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

### Transfer Pathway

This transfer agreement provides for a direct transfer into second year of a Bachelor of Applied Science (Engineering) at Thompson Rivers University. Individual course equivalencies, established in the BC Transfer Guide, form the foundation of this agreement. The following conditions will apply:

- Students progressing into the Bachelor of Engineering in Software Engineering at Thompson Rivers University will be **required** to successfully complete:
  - MATH 1700 – *Discrete Mathematics*, and
  - SENG 1210 – *Programming for Engineers II*. at the earliest scheduled date for each course at that institution to validate their transfer.
- Students fully completing the CFYEC will receive transfer credit for:
  - CHEM 1520 – *Principles of Chemistry*,  
Which is course is normally scheduled in Year 2 at TRU.
- Applicants who have successfully completed all courses within the CFYEC with a *minimum TRU GPA of C+ (or TRU GPA of 2.33) and have no courses applicable for transfer with a grade less than a 'C'* will be guaranteed second year standing within the Bachelor of Engineering in Software Engineering at TRU.
- Applications from the CFYEC must follow all applications procedures at TRU, including applying for admission and submitting post-secondary and high school academic transcripts.

*Course-to-Course Transfer (BCCAT)*

<b>Course</b>	<b>TRU</b>
<b>CALC I</b>	MATH 1130
<b>CALC II</b>	MATH 1230
<b>CHEM I*</b>	CHEM 1520
<b>CSCII</b>	SENG 1110
<b>ENGL I</b>	ENGL 1100
<b>ENGL II</b>	CMNS 1290

<b>Course</b>	<b>TRU</b>
<b>ENGR I</b>	ENGR 1100
<b>ENGR II</b>	ENGR 1200
<b>LALG I</b>	MATH 1300
<b>PHYS I</b>	EPHY 1170
<b>PHYS II</b>	EPHY 1270
<b>PHYS III</b>	EPHY 1700

Approved by:



4/3/2020 | 16:57:44 PDT

Christine L. Bovis-Crossen, Provost and Vice-President Academic and Research Date  
Thompson Rivers University

—

## APPENDIX C: Additional Requirements- University of British Columbia (Okanagan Campus)

### Curriculum

In addition to the core CFYEC curriculum, the University of British Columbia (Okanagan Campus) requires the completion of the following courses:

- PHYS III
- CS I [As of 31.Dec.2026]

### Minimum AU/GA Delivery Requirements

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
CS I	3	3	-	36				36			
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>84</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>567</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

### Transfer Pathway

The CFYEC provides a seamless transfer into second year engineering at UBC Okanagan (UBCO). This formal agreement is based both on individual course equivalencies established in the BC Transfer Guide as well as recognition of course groupings specific to the CFYEC. The following conditions apply:

1. Each CFYEC signatory sender is allocated seats based on the second-year admission capacity of UBC-O. The estimate of this seat capacity for each PSI will be provided at the annual articulation meeting. This estimate will have effect one year after that reporting out date.
2. [Until 31.Dec.2026] Provided that the number of students completing the entire CFYEC within two terms (typically eight months), no later than 30-Jun, and with a minimum CGPA or higher, does not exceed the number of allocated seats for a given PSI, students meeting the CGPA requirement will be guaranteed placement at UBC-O.

[After 31.Dec.2026] If CFYEC and addition required courses for UBCO are completed:

- Within two years,
- No later than 30.Apr of the year that applicants applies to UBCO,
- With a minimum GPA, and
- A minimum course load of 12 credits for at least two terms while enrolled in the CFYEC

Applicants will be eligible for guaranteed admission into the second year of the Bachelor of Applied Science at UBCO

3. Once all transfer students have been placed under condition #2, additional admission offers may be made outside that condition provided seat capacity at UBC-O remains.

Under the CFYEC:

- All students (transfer or direct entry) will compete equivalently for placement in their first choice of engineering program in second year at UBC-O.
- As of 31.Dec.2026, UBC-O requires that CFYEC students successfully complete a CS course. Please speak to a UBC-O Engineering Academic Services for specific course options<sup>16</sup>.

Until 31.Dec.2026, students who transfer to UBC-O with either ENGL II or a CS elective will be considered as fulfilling the CFYEC requirements. Students will be considered under the new requirements immediately and in parallel to this condition while it is in effect.

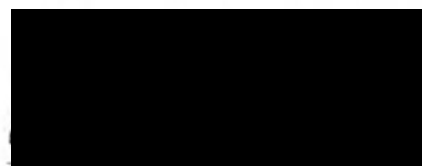
### Course-to-Course Transfer (BCCAT)

Course	UBC-O
CALC I	APSC 172
CALC II	APSC 173
CHEM I*	APSC 180
PHYS I	APSC 181
PHYS III	APSC 182
	APSC 183
CSCI I	APSC 177

Course	UBC-O
ENGL I	APSC 176
CS I	CS Credit
ENGR I	APSC 169
ENGR II	APSC 171
LALG I	APSC 179
PHYS II	APSC 178

Approved by:

*AELIAN SADIQ / Exec. Assoc. Dean*  
Name / Title (Print)



Signature

\*Signature ported from v1.41

<sup>16</sup><https://engineering.ok.ubc.ca/student-resources/engineering-academic-services-undergraduate-students/>

## APPENDIX D: Additional Requirements- University of British Columbia (Vancouver Campus)

### *Curriculum*

In addition to the core CFYEC curriculum, the University of British Columbia (Vancouver Campus) requires the completion of the following courses:

- PHYS III

And recommends the completion of the following courses:

- CS I

### *Minimum AU/GA Delivery Requirements*

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>48</b>	-	<b>24</b>	<b>24</b>	-	<b>24</b>	-	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>531</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>53</b>	<b>87</b>	<b>34</b>	<b>121</b>

### *Transfer Pathway*

The CFYEC provides a seamless transfer into second year engineering at UBC Vancouver (UBC-V). This formal agreement is based both on individual course equivalencies established in the BC Transfer Guide as well as recognition of course groupings specific to the CFYEC. The following conditions apply:

4. Each CFYEC signatory sender is allocated seats based on the second-year admission capacity of UBC-V. The estimate of this seat capacity for each PSI will be provided at the annual articulation meeting. This estimate will have effect one year after that reporting out date.
5. Provided that the number of students completing the entire CFYEC within two terms (typically eight months), no later than 30-Jun, and with a minimum CGPA or higher, does not exceed the number of allocated seats for a given PSI, students meeting the CGPA requirement will be guaranteed placement at UBC-V.
6. Once all transfer students have been placed under condition #2, additional admission offers may be made under that condition provided seat capacity at UBC-V remains.

Under the CFYEC:

- All students (transfer or direct entry) will compete equivalently for placement in their first choice of engineering program in second year at UBC-V.

- UBC-V recommends that CFYEC students enrol in a CS course as described here: <https://academicservices.engineering.ubc.ca/degree-planning/course-planning/>. Completion of a CS course is not required to fulfill the CFYEC pathway.

*Course-to-Course Transfer (BCCAT)*

Course	UBC-V
<b>CALC I</b>	MATH 100
<b>CALC II</b>	MATH 101
<b>CHEM I*</b>	CHEM 154
<b>CSCII</b>	APSC 160
<b>ENGL I</b>	WRDS 150
<b>CS I</b>	CS Credit
<b>ENGR I</b>	APSC 100
<b>ENGR II</b>	APSC 101

Course	UBC-V
<b>LALG I</b>	MATH 152
<b>PHYS I</b>	PHYS 157
<b>PHYS II</b>	PHYS 158 PHYS 159
<b>PHYS III</b>	PHYS 170

Approved by:

*Carol Jaeger*  
 \_\_\_\_\_  
 Name / Title (Print)

\_\_\_\_\_  
 Signature

\*Signature ported from v1.41 (with permission)

## APPENDIX E: Additional Requirements- University of Victoria

### Curriculum

In addition to the core CFYEC curriculum, the University of Victoria recommends completion of the following courses prior to transfer:

#### Software Engineering

- CSCI II
- ENGL II

#### All other engineering degrees

- PHYS III
- ENGL II

### Minimum AU/GA Delivery Requirements

#### Software Engineering

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
CSCI II	3	3	2	46	-	-	-	-	46	-	46
<b>Total</b>				<b>82</b>	-	-	-	<b>36</b>	<b>46</b>	-	<b>46</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>565</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>89</b>	<b>109</b>	<b>34</b>	<b>143</b>

#### All other engineering degrees

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>84</b>	-	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	-	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>567</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

### Transfer Pathway

This transfer agreement provides for a direct transfer into second year Engineering at the University of Victoria. Individual course equivalencies, established in the BC Transfer Guide, form the foundation of this agreement. The following conditions will apply:

- ENGR 130 (Introduction to Professional Practice) must be completed by all students in the program soon after they begin in a UVic Engineering Program
- This transfer agreement features guaranteed admission into second year of one of the Bachelor of Engineering programs for students who have successfully completed all of

the course in the agreement with a *minimum UVIC GPA of C+ (or UVic 3.0)* and who have *no course transferrable to a UVic Engineering program with a grade less than a C.*

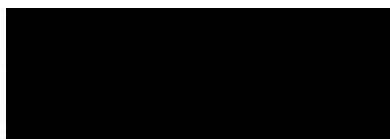
- Students accepted under this agreement will complete on an equal footing with UVic students for placement in their chosen engineering program.

### Course-to-Course Transfer (BCCAT)

Course	UVic
<b>CALC I</b>	MATH 100
<b>CALC II</b>	MATH 101
<b>CHEM I*</b>	CHEM 150
<b>CSC I</b>	CSC 110
<b>CSC II</b>	CSC 115 or CSC 116
<b>ENGL I</b> <b>ENGR I</b>	ENGR 110

Course	UVic
<b>ENGL II</b> <b>ENGR II</b>	ENGR 120
<b>LALG I</b>	MATH 110
<b>PHYS I</b> <b>PHYS II</b>	PHYS 110 PHYS 111
<b>PHYS III</b>	ENGR 141

Approved by:



Lillanne Jackson, Associate Dean – Undergraduate Studies  
University of Victoria

Apr. 22/20

Date

## APPENDIX F: Additional Requirements- University of Northern BC

### Curriculum

In addition to the core CFYEC curriculum, the University of Northern British Columbia requires the completion of the following courses:

- PHYS III
- ENGL II

### Minimum AU/GA Delivery Requirements

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>84</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>567</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

### Transfer Pathway

This transfer agreement provides for a direct transfer into second year Engineering at the University of Northern British Columbia. Individual course equivalencies, established in the BC Transfer Guide, form the foundation of this agreement. The following conditions will apply:

- Students completing the entire CFYEC within two academic years, no later than 30-Apr, with a minimum CGPA<sup>22</sup> or higher, and no individual course less than a 'C-' will be guaranteed placement within the Bachelor of Applied Science (Engineering) at UNBC.
- Applications from the CFYEC must follow all applications procedures at UNBC, including applying for admission and submitting post-secondary and high school academic transcripts.
- Students completing the entire CFYEC will have the UNBC CHEM 100 (General Chemistry I) requirement waived.
- Students transferring through a CFYEC program and intending on majoring in Environmental Engineering at UNBC will be exempt from UNBC CHEM 101/121 as a pre-requisite for UNBC ENGR 220. Students wishing to take UNBC FSTY 205 and subsequent soil courses (electives within the environmental engineering program) will be required to take UNBC CHEM 101 / 121 upon transfer.

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<sup>22</sup>Minimum CGPA will be reviewed annually and reported at the BCCAT Engineering articulation committee meeting in the year prior to the expected UNBC start date.

*Course Block Transfers (BCCAT)*

<b>Course</b>	<b>UNBC</b>
<b>CALC I</b>	MATH 100
<b>CALC II</b>	MATH 101
<b>CHEM I*</b>	CHEM 1XX CHEM 120
<b>CSCI I</b>	CPSC 110
<b>ENGL I</b>	N/A
<b>ENGL II</b>	ENGR 110

<b>Course</b>	<b>UNBC</b>
<b>ENGR I</b>	ENGR 117
<b>ENGR II</b>	ENGR 151 ENGR 152
<b>LALG I</b>	MATH 220
<b>PHYS I</b>	PHYS 110
<b>PHYS II</b>	PHYS 111
<b>PHYS III</b>	ENGR 130

Approved by:



University of Northern British Columbia  
Mark Dale, Interim Provost and Vice President, Academic

November 6, 2020

Date

## APPENDIX G: Additional Requirements- Simon Fraser University – Faculty of Applied Sciences

### *Bridging Courses*

In addition to the core CFYEC curriculum, the Faculty of Applied Sciences at Simon Fraser University (SFU) requires completion of the following courses prior to transfer:

- ENGL II

Further, individual schools within the Faculty of Applied Science have specific advice:

Students progressing to the School of Engineering Science (ENSC) at SFU will be **required** to successfully complete:

- ENSC 120 - *Introduction to Electronics Laboratory Instruments Operation and Measurement Techniques* at its earliest scheduled date at that institution for degree progression.
- ENSC 180 - *Introduction to Engineering Analysis* by no later than their 3rd year level of studies at that institution, and prior to enrolling in ENSC 380.

In addition to the core CFYEC curriculum, ENSC recommends completion of:

- CS I, as described here:  
<https://www.sfu.ca/fas/study/current-students/school-of-engineering-science/undergraduates/program-requirements/preapproved-electives.html>

Students progressing to the School of Mechatronic Systems Engineering at SFU will be **required** to successfully complete:

- PHYS III, **prior** to transfer.
- MSE 152 – *Digital Computing Fundamentals* by no later than their 3rd year level of studies at that institution, and prior to enrolling in MSE 352. Completion of this course prior to enrolling in MSE 252 is recommended.
- MSE 112 – *Mechatronic Design Studio* at its earliest scheduled date at that institution for degree progression, and prior to enrolling in MSE 212.

Students progressing to the School of Sustainable Energy Engineering at SFU will be **required** to successfully complete:

- SEE 110 – *Energy, Environment and Society* by no later than their 3rd year level of studies at that institution, and prior to enrolling in SEE 402.
- SEE 111 – Integrated Energy Solution I by no later than their 3<sup>rd</sup> year level of studies at institution

### Minimum AU/GA Delivery Requirements

#### ENSC

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
CS I	3	3	-	36							
<b>Total</b>				<b>72</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>555</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

#### MSE

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
PHYS III	3	4	-	48		24	24	-	24	-	24
<b>Total</b>				<b>84</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>567</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

#### SEE

Course	Cred.	Lec	Lab/Tut	Total AU	M	NS	M+NS	CS	ES	ED	ES+ED
ENGL II	3	3	-	36				36			
<b>Total</b>				<b>36</b>	<b>-</b>	<b>24</b>	<b>24</b>	<b>36</b>	<b>24</b>	<b>-</b>	<b>24</b>
<b>CFYEC Baseline</b>				<b>483</b>	<b>144</b>	<b>189</b>	<b>333</b>	<b>53</b>	<b>63</b>	<b>34</b>	<b>97</b>
<b>Sum</b>				<b>519</b>	<b>144</b>	<b>213</b>	<b>357</b>	<b>89</b>	<b>87</b>	<b>34</b>	<b>121</b>

### Transfer Pathway

Two direct transfer pathways will be available to students from the CFYEC into the SFU School of Engineering Science, the SFU School of Mechatronic Systems Engineering, and the SFU School of Sustainable Energy Engineering: Assured Admission and Competitive Admission.

Applicants from both pathways must meet the general SFU English language and quantitative admission requirements.

Admission into the Assured Admission pathway is limited to domestic students. International students are eligible for the Competitive Admission pathway which is dependent on the availability of international student seats at SFU within the School of Engineering Science, the School of Mechatronic Systems Engineering, and the School of Sustainable Energy Engineering.

If the Assured Admission Program GPA required on the pathway courses in the CFYEC program is higher than the current CGPA cutoff for external transfer students transferring into SFU Faculty of Applied Sciences, students may be admitted via the assured pathway based on the current CGPA cutoff for external transfer students.

#### Assured Admission Pathway

To qualify for Assured Admission students must have a GPA of at least 2.75 on the required pathway courses from the CFYEC (calculated using the best attempt for each course) and an overall CGPA of 2.75 on any transferable coursework from all postsecondary institutions attended (calculated using the best attempt for each course). All credits must be obtained within 16 months. In addition, students must meet a minimum course load of 12 credits for at least two terms while enrolled in the CFYEC.

Students who were required to withdraw or were not in good academic standing upon leaving a former post-secondary institution, or who were formerly in a Faculty of Applied Sciences program at SFU, are not eligible for consideration under the Assured Admission pathway.

**The School of Engineering Science** provides a minimum of 10 seats for the assured admission pathway. If more than 10 applications are received in a given year, seats will be allocated on a competitive basis based on CGPA.

**The School of Mechatronic Systems Engineering** provides a minimum of 10 seats for the assured admission pathway. If more than 10 applications are received in a given year, seats will be allocated on a competitive basis based on CGPA.

**The School of Sustainable Energy Engineering** provides a minimum of 10 seats for the assured admission pathway. If more than 10 applications are received in a given year, seats will be allocated on a competitive basis based on CGPA.

#### Competitive Admission Pathway

Students enrolled in the CFYEC who either do not meet the assured admission pathway criteria or are outside its 10 seat allocation may be eligible to enter the SFU School of Engineering Science, the SFU School of Mechatronic Systems Engineering, or the SFU School of Sustainable Energy Engineering based on existing Canadian college/university transfer criteria for admission (24 credits of transferable coursework, which must include the courses specified for Canadian college/university transfer into the Faculty of Applied Sciences and the respective Schools, found on the SFU Admissions website

(<https://www.sfu.ca/students/admission/admission-requirements.html>).

Students must also meet the competitive admission GPA requirement for the Faculty of Applied Sciences for the term in which they are applying for admission to SFU.

### *Course-to-Course Transfer – SFU School of Engineering Science*

Course	SFU – Engineering Science
CALC I	MATH 151 (3)
CALC II	MATH 152 (3)
CHEM I	CHEM 121 (4)
CSCII	ENSC 151 (3)
ENGL I	ENGL 1XX (3) W
CS I	CS Credit

Course	SFU – Engineering Science
ENGL II	ENSC 105 (3)
ENGR I	ENSC 100 (3)
ENGR II	
LALG I	MATH 232 (3)
PHYS I	PHYS 120 (3)
PHYS II	PHYS 132 (1)
	PHYS 121 (3)
	PHYS 133 (1)

### *Course-to-Course Transfer – SFU School of Mechatronic Systems Engineering*

Course	SFU – Mechatronic Systems
CALC I	MATH 151 (3)
CALC II	MATH 152 (3)
CHEM I	CHEM 121 (4)
CSCII	CMPT 130 (3)
ENGL I	ENGL 1XX (3) W

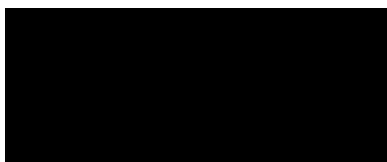
Course	SFU – Mechatronic Systems
ENGL II	MSE 101W (3)
ENGR I	MSE 102 (3)
ENGR II	
LALG I	MATH 232 (3)
PHYS I	PHYS 140 (4)
PHYS II	PHYS 141 (4)
PHYS III	MSE 103 (3)

### *Course-to-Course Transfer – SFU School of Sustainable Energy Engineering*

Course	SFU – Sustainable Energy
CALC I	MATH 151 (3)
CALC II	MATH 152 (3)
CHEM I	CHEM 121 (4)
CSCII	CMPT 130 (3)
ENGL I	ENGL 1XX (3) W

Course	SFU – Sustainable Energy
ENGL II	SEE 101W (3)
ENGR I	SEE 100 (3)
ENGR II	
LALG I	MATH 232 (3)
PHYS I	PHYS 140 (4)
PHYS II	PHYS 141 (4)

Approved by:



Catherine Dauvergne, Vice-President, Academic and Provost, SFU

\*Signature ported from v1.41 (with permission)

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## APPENDIX H: Sending PSIs Equivalencies to CFYEC Course Units

CFYEC	CapU	CMNT	CNC	CAMO	CoTR	DOUG	KPU	Langara	NIC	OC	Selkirk	UFV	TRU	VCC	VIU
<b>CALC I</b>	MATH 116	MATH 101	MATH 101	MATH 100	MATH 103	MATH 1120	MATH 1120	MATH 1171 <sup>1</sup>	MAT 181	MATH 112	MATH 100	MATH 111	MATH 1130	MATH 1100	MATH 100 <sup>2</sup>
<b>CALC II</b>	MATH 126	MATH 102	MATH 102	MATH 101	MATH 104	MATH 1220	MATH 1220	MATH 1271 <sup>3</sup>	MAT 182	MATH 122	MATH 101	MATH 112	MATH 1230	MATH 1200	MATH 101 <sup>4</sup>
<b>CHEM I*</b>	CHEM 154	CHEM 111	CHEM 150	CHEM 150	CHEM 115 <sup>5</sup>	CHEM 1150	CHEM 1154 <sup>10</sup>	CHEM 1154	CHE 152	CHEM 111 <sup>8</sup>	CHEM 120	CHEM 113 + CHEM 116 <sup>9</sup>	CHEM 1520	CHEM 1121	CHEM 150
<b>CSCI I</b>	COMP 120	CPSC 123	CSC 109	COMP 166	COMP 105	CPSC 1109	CPSC 1103	CPSC 1155	CPS 102	COSC 111	CPSC 100	ENGR 153	SENG 1110	CMPT 1010	CSCI 160
<b>CSCI II</b>	COMP 126 or 215	CPSC 124	CSC 110 or 216	COMP 139	N/A	CPSC 1209	CPSC 1204	CPSC 1160	CPS 101	COSC 121	CPSC 101	COMP 155	COMP 1230, 1231, 2120, or 1210	CMPT 1020 or CSTP 1205	CSCI 161
<b>ENGL I</b>	ENGL 100	ENGL 101	ENGL 103	ENGL 151	ENGL 100	ENGL 1130	ENGL 1100	ENGL 1123	ENG 115	ENGL 100	ENGL 100	ENGL 105	ENGL 1100	ENGL 1100	ENGL 115
<b>ENGL II</b>	CMNS 250	ENGL 151	ENGL 229	ENGL 251	CMC 102	CMNS 1135	CMNS 1140	CMNS 2228 <sup>6</sup>	ENG 160	CMNS 133	TWC 130	CMNS 251	CMNS 1290	SCIE 1110	ENGL 204
<b>ENGR I</b>	APSC 130	ENGR 121	APSC 101	ENGR 193	ENGR 101	ENGR 1110	APSC 1124 & APSC 1151	CPSC 1091	ENR 100	ENGR 101	ENGR 100	ENGR 123	ENGR 1100	SCIE 1100	ENGR 112
<b>ENGR II</b>	APSC 140	ENGR 122	APSC 102	ENGR 194	ENGR 102	ENGR 1190	APSC 1299	CPSC 1491	ENR 101	ENGR 111	ENGR 101	ENGR 124	ENGR 1200	SCIE 1151	ENGR 121
<b>LALG I</b>	MATH 152	MATH 235	MATH 204	MATH 251	MATH 221	MATH 2210	MATH 1152	MATH 1252	MAT 133	MATH 221	MATH 221	MATH/ ENGR 152	MATH 1300	MATH 1221	MATH 141
<b>PHYS I</b>	PHYS 114	PHYS 121	PHYS 101	PHYS 140	PHYS 103	PHYS 1110	PHYS 1120	PHYS 1125 <sup>7</sup>	PHY 120	PHYS 111	PHYS 104	PHYS 111	EPHY 1170	PHYS 1100	PHYS 121
<b>PHYS II</b>	PHYS 115	PHYS 122	PHYS 102	PHYS 141	PHYS 104	PHYS 1210	PHYS 1220	PHYS 1225	PHY 121	PHYS 121	PHYS 105	PHYS 112 + ENGR 115	EPHY 1270	PHYS 1200	PHYS 122
<b>PHYS III</b>	PHYS 116	PHYS 135	PHYS 204	ENGR 175	ENGR 141	PHYS 1170	PHYS 1141 or 1170	PHYS 1219	PHY 170	PHYS 202	PHYS 200	ENGR 113	EPHY 1700	PHYS 1170	ENGM 141

\*NLC data not yet provided

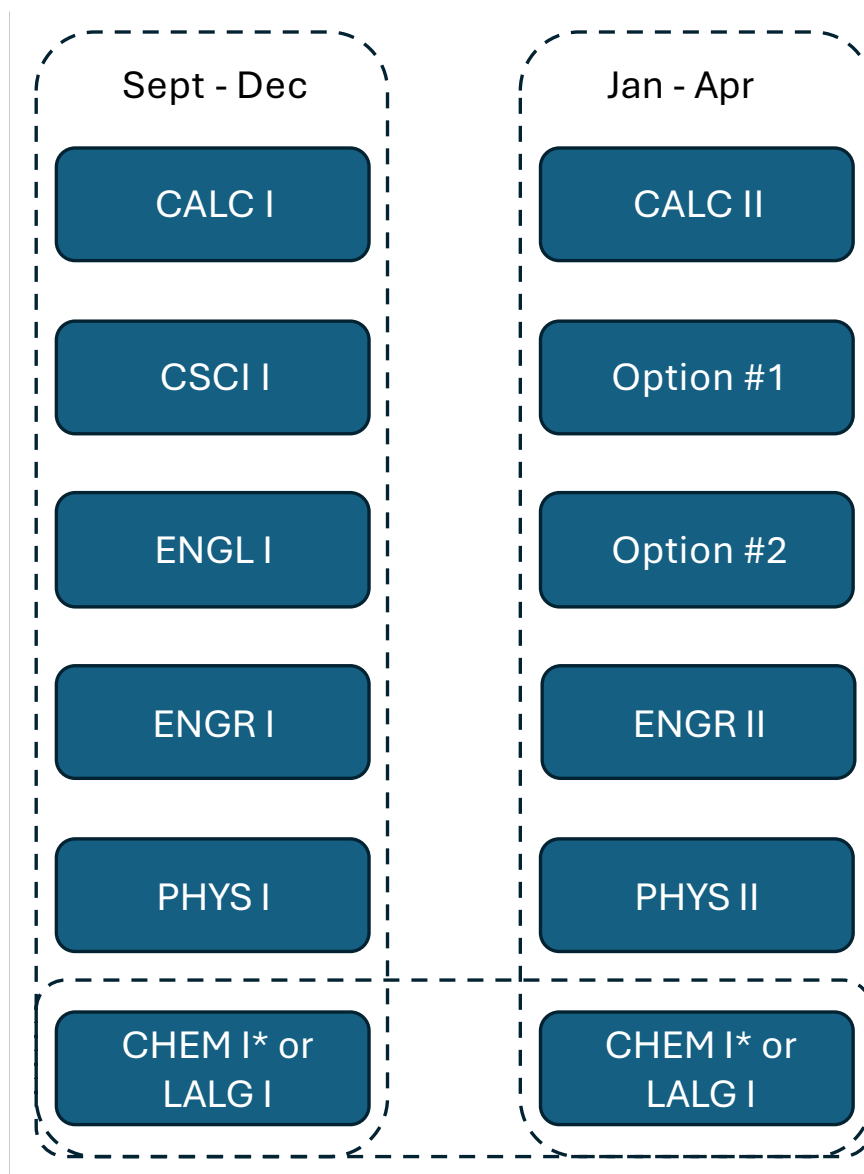
<sup>1</sup>MATH 1173 + MATH 1183 may be used as equivalent at Langara<sup>2</sup>MATH 121 may be used as equivalent at VIU<sup>3</sup>MATH 1273 + MATH 1283 may be used as equivalent at Langara<sup>4</sup>MATH 122 may be used as equivalent at VIU<sup>5</sup>CHEM 101 + CHEM 102 may be used as equivalent at CoTR<sup>6</sup>ENGL 1129 may be used as equivalent at Langara<sup>7</sup>PHYS 1125 + PHYS 1225 = PHYS I + PHYS II for Langara<sup>8</sup>CHEM 111 + CHEM 121 = CHEM I for OC<sup>9</sup>CHEM 113 + CHEM 114 may also be used as equivalent at UFV<sup>10</sup>CHEM 1110 & CHEM 1210 may be used as equivalent at KPU

## APPENDIX I: CFYEC Credentials

Capilano University	Engineering Certificate Engineering Transition Diploma
Coast Mountain College	Engineering Certificate
College of the Rockies	Engineering Certificate
College of New Caledonia	Engineering Transfer Certificate
Douglas College	Engineering Foundations Certificate
Kwantlen Polytechnic University	Engineering First-Year Certificate
Langara College	Art & Science (Engineering) Certificate Applied Science for Engineering Diploma
Okanagan College	Common First-Year Engineering Certificate
Northern Lights College	Engineering Studies Certificate
North Island College	Engineering Foundations Certificate
Selkirk College	Engineering Transfer - Certificate
Thompson Rivers University	Engineering Transfer Program
University of the Fraser Valley	Engineering Common Core Certificate
Vancouver Community College	University Transfer – Engineering Certificate
Vancouver Island University	Engineering Transfer Certificate Engineering Transfer Diploma

## APPENDIX J: Suggested Curriculum Mapping

For students intending to transfer upon completing the CFYEC, application deadlines for most engineering schools typically start in January of each year. To meet the requirements of all receiving institutions and to ensure the greatest flexibility for students with respect to their choice of receiving institution, the following curriculum is suggested.



This curriculum is intended to complete the CFYEC requirements in two terms (8-months) and prior to 30.Apr. Note that most receiving institutions do not require completion over this time frame. Please consider each engineering school's respective appendix for detail on both their pathway and curricular requirements (e.g. Options #1 and #2 in the above graphic). Although CHEM I\* and LALG I are indicated as not having a preferred term, scheduling CHEM I\* in the Sept-Dec term may allow for a second Chemistry class in Jan – Apr, benefiting transfers to some institutions (e.g. UNBC).

## APPENDIX K: Definitions

<b>Articulation Unit (AU)</b>	<p>Defined on an hourly basis for an activity which is granted academic credit and for which the associated number of hours corresponds to the actual contact time of that activity between the student and the faculty members, or designated alternate, responsible for delivering the program:</p> <ul style="list-style-type: none"><li>• one hour of lecture (corresponding to 50 minutes of activity) = 1 AU</li><li>• one hour of laboratory or scheduled tutorial = 0.5 AU This definition is applicable to most lectures and periods of laboratory or tutorial work. Classes of other than the nominal 50-minute duration are treated proportionally. In assessing the time assigned to determine the AU of various components of the curriculum, the actual instruction time exclusive of final examinations should be used</li></ul>
<b>Mathematics (M)</b>	<p>Includes appropriate elements of linear algebra, differential and integral calculus, differential equations, probability, statistics, numerical analysis, and discrete mathematics.</p>
<b>Natural Sciences (NS)</b>	<p>Include elements of physics and chemistry; elements of life sciences and earth sciences may also be included in this category. These subjects are intended to impart an understanding of natural phenomena and relationships through the use of analytical and/or experimental techniques.</p>
<b>Engineering Science (ES)</b>	<p>Involves the application of mathematics and natural science to practical problems. This may involve the development of mathematical or numerical techniques, modeling, simulation, and experimental procedures. Such subjects include, among others, the applied aspects of strength of materials, fluid mechanics, thermodynamics, electrical and electronic circuits, soil mechanics, automatic control, aerodynamics, transport phenomena, and elements of materials science, geoscience, computer science, and environmental science. In addition to program-specific engineering science, the curriculum must include engineering science content that imparts an appreciation of the important elements of other engineering disciplines.</p>
<b>Engineering Design (ED)</b>	<p>Integrates mathematics, natural sciences, engineering sciences, and complementary studies in order to develop elements, systems, and processes to meet specific needs. It is a creative, iterative, and open-ended process, subject to constraints which may be governed by standards or legislation to varying degrees depending upon the discipline. These constraints may also relate to economic, health, safety, environmental, societal or other interdisciplinary factors.</p>

**Complementary Studies (CS)**

Include humanities, social sciences, arts, management, engineering economics and communications that complement the technical content of the curriculum. While considerable latitude is provided in the choice of suitable content for the complementary studies component of the curriculum, some areas of study are essential in the education of an engineer. Accordingly, the curriculum must include studies in the following: a) Subject matter that deals with the humanities and social

sciences

- b) Oral and written communications
- c) Professionalism, ethics, equity and law
- d) The impact of engineering on society e)

Health and safety

- f) Sustainable development and environmental stewardship
- g) Engineering economics and project management

**Graduate Attributes (GA)**

The institution must demonstrate that the graduates of a program possess the attributes under the following headings. The attributes will be interpreted in the context of candidates at the time of graduation. It is recognized that graduates will continue to build on the foundations that their engineering education has provided<sup>24</sup>.

1. A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program
2. Problem Analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.
3. Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information in order to reach valid conclusions.
4. Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

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<sup>24</sup>From <https://engineerscanada.ca/sites/default/files/Graduate-Attributes.pdf> (fetched 04.May.2018)

5. Use of Engineering Tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.
6. Individual and Team work: An ability to work effectively as a member and leader in teams, preferably in a multidisciplinary setting.
7. Communication Skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
8. Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.
9. Impact of Engineering on Society and the Environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainability design and development and environmental stewardship.
10. Ethics and Equality: An ability to apply professional ethics, accountability, and equity.
11. Economics and Project Management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.
12. Life-long Learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.

## APPENDIX H: REVISION HISTORY

Version	Comments	Date
1.00	Initial Draft	21.Apr.2018
1.01	Minor editing; CHEM II topical coverage replace by learning outcomes; ENGR I/II description updated; page numbers and header added; order of terms adjusted. P.Eng/Eng.L requirement added to specific course loads. PHYS III credits reduced to 3; editorial changes; addition of FOIPA requirement to access to applicant requirement; Canada-wide professional requirement from BC-only	27.Apr.2018
1.02	GA filled in from Engineers Canada reference; P.Eng/Eng.L requirement added to PHYS III; Added - Sending term suggestion to articulate course packages as much as possible	04.May.2018
1.1	P.Eng/Eng.L requirement removed from PHYS III (AUs adjusted accordingly for impacted institutions); CALC I/II description adjusted to match the first-year core calculus - science stream; Sequences and series, complex numbers, and polar coordinates and parametric equations added as recommended additional topics; MATLAB content LALG I changed to suggested; Course block transfers to each major receiving institution for units in the common curriculum added as Appendix I; Definitions renumbers as Appendix J; Term shorten to 12 effective weeks (AUs/GAs adjusted accordingly); GAs explicitly claimed in main text; Assessment methods removed from course unit descriptions ; PHYS I/II description re-structured.	24.May.2018
1.11	Clarity added to signature sheets; Pathway material is provided; Learning Outcomes header replaced by Learning Topics for some courses; Learning Outcome statements adjusted to better reflect a learning outcome; hours added to ethics/profession; impact on environment LO added to sustainability topic.	02.Jun.2018
1.12	Course-by-course articulation wording strengthened; clarity on term lengths; Adjustment to effective dates for change requests and withdrawal; Math curriculum update (2013) reflected; SFU Transfer pathway/requirements updated; Course-by-course transfers moved to Institutional appendix; P.Eng/Eng.L equivalency statement added. Minor edits.	12.Jun.2018
1.122	Minor editing. Agreed to by UBC, UVic, and UNBC at this iteration.	28.Aug.2018

<b>Version</b>	<b>Comments</b>	<b>Date</b>
1.123	Minor change to AU counts; Transfer pathway added to UNBC; TRU transfer pathway added	22.Nov.2018
1.130	Removed SFU pathways; Correct typo in UNBC requirements; Added signature lines for sending and receiving institutions.	28.Jan.2020
1.131	College of the Rockies added to signature page.	06.Feb.2020
1.40	Section 2.0f amended to include a good faith description and appropriate wording changes; TRU Appendix adjusted to reflect current practice; Signature page updated to reflect only capacity grant recipients and those who have explicitly indicated intent to sign.	12.Feb.2020
1.41	SFU Signature page added. Appendix adjusted. Note prior signatures ported from v1.140.	28.Oct.2021
1.50	Suggested entry requirement adjusted; Added requirement for annual reporting of instructors teaching courses requiring a licensed engineer; UFV signature added; Selkirk College signature added; Okanagan College signature added; SFU transfer appendix updated – ENGL II added to transfer pathway, CSCI I transfer clarified; UBCV/UBCO transfer appendices updated – ENGL II reduced to optional, pathway opened to all CFYEC PSIs under an enrolment management protocol, and ENGL 112 replaced by WRDS 150 to reflect current practice; SFU transfer appendix updated – ENGL II credit applied to both MSE & SEE, SEE 111 credit removed (effective 2025-May); Sending PSI to CFYEC course unit table added as Appendix H (Definitions moved to Appendix I). Note that all signatures are ported over from earlier version of this document – impact on students is neutral to positive (excluding SFU SEE update); no signature renewal was deemed to be required. UNBC appendix expanded.	15.Dec.2023
1.51	Replaced recommended wording to required (as originally intended); Clarity in PHYS I/II language – lecture/lab; SFU appendix adjusted to address changes in the MSE curriculum; UVic appendix adjusted to address changes in the SWE curriculum.	10.Sept.2024
1.511	Camosun College added to signature page	04.Nov.2024
1.512	Kwantlen Polytechnic added to signature page	10.Jun.2025

<b>Version</b>	<b>Comments</b>	<b>Date</b>
2.0	Reduction from 11 to 10 required courses within the CFYEC; Inclusion of two of four optional courses for each PSI stream. Language within text to reflect above changes; Appendix I added to include credential names (Appendices re-lettered); Reference to Ostafichuk & Jaeger textbook added; Reference to Open Education resources for Mechanics (PHYS III) added; Suggested course mapping (8-month completion) included as an Appendix	30.Jun.2025
2.01	Douglas College added as a signatory sending institution	19.Jan.2026