Required Visit Materials

A. Program Operational Information

In support of criteria 3.1, 3.2, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.4.7, 3.4.8

This information is provided in the Questionnaire and associated documents before the visit. Links to documents (or areas in a larger document) that provide a direct answer to the question posed are acceptable. If a precise link to information is not possible, provide a short summary.

B. Graduate Attributes and Continual Improvement Detailed Explanation

In support of criteria 3.1, 3.2

This information may be given at a presentation to all visiting team members or provided at other meetings during the visit.

1. Explain the strategy of GA/CI, including involvement of teaching staff, curriculum or other committees involved with the process, how the procedures and processes are implemented at program, faculty, and institutional levels, and how these levels participate in the process.
2. Describe the philosophy behind the curriculum, including sequencing of courses, highlighting linkages.
3. Explain the choice of indicators, linking to course learning objectives.
4. Explain philosophy and choice of assessment tools.
5. Explain compilation and interpretation of results.
6. Explain the improvement process, and how GAs contribute to decisions.
7. Describe the program's internal and external stakeholder consultations.
8. Discuss improvement actions, their implementation, and timelines.
9. Provide three examples where assessment results were considered as a part of program improvement actions.
10. Evaluate the overall GA/CI process, discuss what is working, what is not working, and any improvements that have been identified and implemented.

C. Detailed Syllabi

In support of criteria 3.1, 3.4

Course Syllabi and additional information as required should be provided in electronic form, eight weeks before the start of the visit.

1. For Core Activities satisfying the Mathematics and Natural Sciences Accreditation Units (AU) requirements, provide course syllabi.
2. For Core and Elective Activities satisfying the Engineering Science and Engineering Design AU requirements, provide a week-by-week (or equivalent) description of course content and learning outcomes, indicating engineering tool use and lab experience.

3. For Core Activities satisfying the Complementary Studies or Other AU requirements, provide references or links to calendar descriptions; a week-by-week (or equivalent) description of course content is not required. If calendar descriptions don't provide clear evidence of humanities, social sciences, arts, languages, management, engineering economics, or communication content, detailed course syllabi including learning outcomes must be provided.
4. For Core and Elective Activities taught outside the Faculty of Engineering (or equivalent) that directly support evidence of Graduate Attributes and are not covered in items C.1 to C.3, provide a detailed, week-by-week (or equivalent) syllabi of course content and expectations, indicating engineering tool use and lab experience.

D. Documentation of Assigned Work and Assessments

In support of criteria 3.1, 3.4.4, 3.4.6, 3.4.7

1. Document the assigned work and assessments of the Program's Learning Activities on the Shortest Graduation Path claiming Engineering Science or Engineering Design Accreditation Units. This information should be provided in electronic form eight weeks before the start of the visit. Provide problem set questions. If questions are from a textbook, provide the text or copies of the questions.
2. Provide laboratory information given to students, as well as detailed marking schemes or detailed rubrics for the Program's Learning Activities on the Shortest Graduation Path. When detailed marking schemes or detailed rubrics are not available, submit up to six samples of marked laboratory work. These samples must include at a minimum three examples of work that in the opinion of the instructor(s) marginally meet expectations at the time of assessment. If all work meets expectations, provide at least three works that, in opinion of the instructor(s), are the lowest quality products.
3. Provide project descriptions with detailed marking schemes or detailed rubrics for the Program's Learning Activities on the Shortest Graduation Path. When detailed marking schemes or detailed rubrics are not available, submit up to six samples of marked project work. These samples must include **at a minimum three examples of work that** in the opinion of the instructor(s) **marginally meet expectations** at the time of assessment. If all work meets expectations, provide at least three works that, in the opinion of the instructor(s), are the lowest quality products.
4. Provide quizzes, tests, exams, and other summative assessments with detailed marking schemes or detailed rubrics, if available for the Program's Learning Activities on the Shortest Graduation Path.

E. Evaluated Student Work

In support of criteria 3.1, 3.4.4, 3.4.6, 3.4.7

Evaluated student work should be provided in electronic form eight weeks before the start of the visit.

1. For culminating design experiences, provide all student deliverables from ten evaluated projects, including, but not limited to, written reports, physical models, or mathematical models as appropriate. If less than ten projects were completed in the course, include all

projects. These samples must include at a minimum, three examples of work that in the opinion of the instructor marginally meet expectations at the time of assessment. If all work meets expectations, provide at least three works that, in the opinion of the instructor(s), are the lowest quality products.

2. For ten Core Learning Activities providing Engineering Science and Engineering Design AUs (other than the Engineering Design Culminating Experiences) taken by all students in the program in the final two years of study, provide exams, quizzes, tests, or other summative assessments that are worth in any combination at least seventy-five per cent of the total mark in the Core Learning Activity. For each assessment, up to six samples may be submitted. These samples must include at a minimum three examples of work that in the opinion of the instructor marginally meet expectations. If all work meets expectations, provide at least three works that, in the opinion of the instructor(s), are the lowest quality products.
3. If the Program requirements for the final two years of study consist of fewer than ten Core Learning Activities, the Program can choose to submit Core Activities in the previous year of study, or high enrolment Elective Learning Activities on the Shortest Graduation Path in the final years. The Program should provide sufficient information to demonstrate compliance to the Criteria.
4. Provide additional examples of performance in Graduate Attributes that have not been included in the culminating design experience (E.1) or the ten learning activities selected in E.2 and E.3 so that at least one sample set related to each of the Graduate Attributes is available. These examples should be taken from courses on the Shortest Graduation Path at an intermediate development (D) or advanced application (A) level. Up to six examples may be provided to support compliance to each of the Graduate Attributes not addressed in E1, E2, or E3, but they must include at least three examples of work that, in the opinion of the instructor(s) at the time of marking, marginally meet expectations.

F. Evidence of a Culture of Safety

In support of criterion 3.4.7

Evidence of a culture of safety should be available at the visit, including, but not limited to safety manuals, documentation of training provided to students, safety meeting minutes, records, and signage.

Exhibits

Supplemental information should be provided at the same time as the completed Questionnaire.

Exhibit 1 - In support of criteria 3.1, 3.2

Information about Graduate Attributes and Continual Improvement of the program.

Exhibit 2 – In support of criteria 3.4.8, 3.6

Sample copy of the degree certificate and a sample copy of an official transcript for all variations of the program.

How to provide required visit materials

While the **Questionnaire for Evaluation of an Engineering Program** and the course information forms must be submitted electronically in Tandem, the accreditation process offers flexibility in how an institution can submit the supporting visit materials that are required.

The table below details which material can be shared outside of Tandem. Where a category of required visit materials shows multiple ways of submission, the table should be read as offering "or" options, not "and" requirements.

If an institution is unsure of the most efficient way to share the required visit materials, they should communicate with their visiting team chair or their assigned visit coordinator at Engineers Canada early on in their preparations to discuss the visiting team's requirements.

REQUIRED VISIT MATERIALS	8 WEEKS PRIOR TO THE VISIT			DURING THE VISIT
	TANDEM		Institution's platform of choice[1]	To be provided **onsite**
	Questionnaire	Course form		
A. Program operational information	✓		✓	
B. GA/CI Detailed Explanation[2]				✓
C. Detailed Syllabi[3]		✓	✓	
D. Documentation of Assigned Work and Assessments[3]		✓	✓	
E. Evaluated Student Work[3]		✓	✓	
F. Evidence of a Culture of Safety[4]				✓
Exhibit 1	✓			
Exhibit 2	✓			

[1] An institution's platform of choice may be any tool or system an institution ordinarily uses to share documentation either internally or externally. This may include an institution's learning management system, a folder system in MS Teams, SharePoint, DropBox, etc.
[2] This refers to the GA/CI presentation traditionally given on the first day of the visit. However, some visiting team members appreciate the opportunity to review this presentation in advance to make the most of the Q&A session that usually follows.
[3] If an institution chooses to share their detailed syllabi, assigned or evaluated student work within the individual course forms in Tandem, it is recommended that they maintain a list of courses they have attached sample materials to.
[4] The requirement is for evidence of a culture of safety to be available *at the visit*. While such evidence may not be limited to formal written documentation, any material that can be shared ahead of the visit will inform the team's onsite needs for evaluation.

Glossary of Terms

Accreditation Units (AU) are 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 alternates, responsible for delivering the program:

- one hour of lecture (corresponding to 50 minutes of activity) = 1 AU
- 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.

Assessment tools: sources of data on student learning. Measurement devices (metrics) used to develop sources of data on student learning (e.g. tests, quizzes, examinations, rubrics, etc.)

– Illustrative example: design report, presentation, essay, examination, standardized exam, oral examination, observed behaviour, focus group, survey, etc.

Complex Engineering Problems: In 2012, the CEAB adopted the definition of complex problem used in the Washington Accord (WA) graduate attribute exemplar. A defining characteristic of professional engineering is the ability to work with complexity and uncertainty since no real engineering project or assignment is exactly the same as any other. Accordingly, the attributes place as central the notions of complex engineering problems and complex problem-solving. A complex engineering problem is defined by the following characteristics:

1. It must require the application of in-depth knowledge
2. It must satisfy at least one of the following additional characteristics:
    a. involves wide-ranging or conflicting Issues
    b. has no obvious solution such that originality is required
    c. involves infrequently encountered issues
    d. is outside accepted standards and codes
    e. involves diverse stakeholders and needs
    f. is posed at a high-level with many components or sub-problems

Content Instructional Level: Programs are asked to classify the instructional level of content relating to one or more graduate attribute in each learning activity (usually a course). It is important that the visiting team verify that course- and program-specific information are accurate, complete and current.

It is assumed that learning activities associated with delivering attributes are organized in a progression from **introductory** (I) through intermediate **development** (D) to advanced **application**

(A) level. These terms classifying instructional level require contextual definition with reference to engineering course content. Over the four years of an engineering program:

1. The depth and the complexity of the material increases
2. The way the material is covered changes
3. Expectations for success change
4. How a student uses the material changes

At the **introductory level** the students learn the working vocabulary of the area of content, along with some of the major underlying concepts. Many of the terms need defining and the ideas are often presented in a somewhat simplified way.

At the **intermediate development level**, the students use their working vocabulary and major fundamental concepts to begin to probe more deeply, to read the literature, and to deepen their exploration into concepts. At this level, students can begin to appreciate that any field of study is a complex mixture of sub-disciplines with many different levels of organization and analysis.

At the **advanced application level**, the students approach mastery in the area of content. They explore deeply into the discipline and experience the controversies, debate, and uncertainties that characterize the leading edges of any field. An advanced student can be expected to be able to relate course material across different courses, to begin to synthesize and integrate and achieve fresh insights. Students at this level are working with the knowledge very differently, perhaps even creating new knowledge through independent investigation.

Core Learning Activities: Learning Activities that all students must successfully complete to graduate from the Program.

Culminating Design Experience: significant design experience based on the knowledge and skills acquired in earlier work and preferably involves teamwork and project management. A capstone design course is one example of a culminating design experience.

Curriculum content: Curriculum content requirements are designed to assure a foundation in mathematics and natural sciences, a broad preparation in engineering sciences and engineering design, and an exposure to non-technical subjects that supplement the technical aspects of the curriculum. The academic level of the curriculum must be appropriate to a university-level engineering program. This need not mean an entire course dedicated to specific material; for example, it may include separate units within an array of courses which address the material.

Curriculum map: a plotted representation (often in the form of a table) that shows the relationship between learning activities (e.g. courses, co-ops, co-curricular activities), instructional and assessment methods, and intended learning for each aspect of a given program so that the relationships and connections among all the elements are easily seen.

– Illustrative example: If a program identifies three indicators to demonstrate the graduate attribute Lifelong Learning, as described above, a table could be used to show which learning experiences (e.g. courses) are used to develop abilities and assess indicators.

Elective Learning Activities: Learning Activities that supplement the Core Learning Activities. Typically, students must successfully complete a specified number of activities selected from a list of eligible electives to graduate from the Program.

Faculty of Engineering (or equivalent): the administrative body governing the program.

First Principles: First principles are the fundamental concepts or assumptions on which a theory, system, or method is based. In engineering, first principles start directly at the level of established laws of chemistry, physics, and mathematics and do not argue by analogy or make use of any empirical formulae or assumptions.

Graduate Attributes: generic characteristics, specified by the Accreditation Board, expected to be exhibited by graduates of accredited Canadian engineering programs at the time of graduation.

In-Depth Knowledge: In-depth knowledge means knowledge gained from courses/learning activities beyond the introductory instructional level.

Indicators: Descriptors of what students must do to be considered competent in the attribute; the measurable and pre-determined standards used to evaluate learning (i.e. measurable characteristics of attributes or components of attributes)..

– Illustrative example: Criterion 3.1.12 requires that students possess the attribute Lifelong Learning. A program might consider that the indicators required to demonstrate that students possess this attribute are:

- *Critically evaluates procured information for authority, currency, and objectivity.*
- *Describes professional and academic societies in the discipline and how new knowledge enters discipline.*
- *Identifies resources and professional associations that address student's own ongoing professional development.*

Learning Activities: typically consist of courses, but may include non-coursework requirements such as seminars, training sessions, or work terms as defined by the Program.

Minimum Number (M) of Elective Activities Specified by the Program: the number of Elective Learning Activities a student must take to graduate, as specified by the Program.

Minimum Path: the set of Learning Activities which provide the least number of Accreditation Units (AUs) within each Canadian Engineering Accreditation Board curriculum component, calculated based on Course Information Sheet input. The Minimum Path calculation assumes the student chooses courses with the lowest number of Engineering Science or Engineering Design AUs, which may require the student to complete more Elective Learning Activities than the minimum number M specified by the program to meet the Criteria specifications, particularly if a Program offers a significant number of Elective Learning Activities with low Engineering Science or Engineering Design AUs.

Modern engineering tools: This refers to tools such as equipment, processes, codes of practice, software, simulation packages, etc. that are considered essential for the given discipline.

Performance Descriptors: Scales of descriptors of the performance levels students have achieved for a specific assessment indicator (e.g. [A/B/C/D/F]; [>80%/70-79%/60-69%/50-59%/<50%]; [innovates/applies/comprehends/knows]; [acceptable/marginal/unacceptable]; [students have mastered…. /students can apply…. /students can describe…. /students know….]).

Performance descriptors should have an "action verb" (apply, comprehend…) and a description of content but either of these components can be implicit or abbreviated in a particular context. (e.g. >80% means "students have mastered introductory chemistry"; <50% means "students have insufficient knowledge of introductory chemistry")

Research: Primary research involves experiments, investigations, or tests carried out to acquire data first-hand. Research in the context of this guide is used more broadly to include data gathered from appropriate technical and non-technical sources, including but not restricted to the peer-reviewed engineering literature, specifications, standards, codes, and reports.

Shortest Graduation Path: the smallest set of Learning Activities a student needs to complete to be granted a degree from a program.

- If the Program meets all AU minima in Core Learning activities, the Shortest Graduation Path includes the Core Learning Activities and any M Elective Learning Activities.
- If the Program requires Elective Learning Activities to meet AU minima, and the Program has internal mechanisms to constrain Elective Learning Activities to ensure AU minima are met, the Shortest Graduation Path includes the Core Learning Activities and M Elective Learning Activities that follow the constraints.
- If the program requires Elective Learning Activities to meet AU minima and has no internal mechanisms to constrain Elective Learning Activities to ensure AU minima are met, the Shortest Graduation Path includes the Core Learning Activities and the Elective Learning Activities calculated by the Minimum Path.

“Specific” Accreditation Units: Curriculum content delivered by faculty members that meet the Accreditation Board accreditation licensure requirements. Engineering licensure is examined only for courses that include engineering science and/or engineering design curriculum content. Please see the *Interpretive statement on licensure expectations and requirements* for further information.

Weakest-link principle: All options in the program are examined. Following the principle that a program is only as strong as its “weakest link”, a program is accredited only if all such variations meet the criteria.