



APEGBC COMPETENCE ASSESSMENT GUIDE



COMPETENCY-BASED ASSESSMENT OF ENGINEERING WORK EXPERIENCE

This document is intended to provide a brief introduction to APEGBC's Competency-Based Assessment system.

OVERVIEW

APEGBC's Competence Assessment System is intended to preserve the valued reputation, responsibility, and professionalism of the P.Eng. designation. The Competency Framework and online system was developed in order to ensure that APEGBC's requirements uphold and protect the public interest while maintaining an equitable, transparent, consistent and efficient registration process. The Competency Framework comprises the required proficiencies to enter the engineering profession and provides clear guidance on the path to registration for applicants, referees, reviewers, and employers alike.

The Competency Experience Reporting System, which enables the experience component of a P.Eng. application to be submitted, validated, and assessed online, was launched in 2012 and is now a recommended reporting option for new applicants and Engineers-In-Training.

COMPETENCY-BASED ASSESSMENT: ELEMENTS AND DEFINITIONS

COMPETENCY

Competency can be defined as the ability to perform the tasks and roles of an occupational category to standards expected and recognized by employers and the community at large. APEGBC's Competency Framework delineates the common competencies related to work experience that are essential for Professional Engineers in all disciplines to ensure effective practice and public safety.

COMPETENCY CATEGORY

APEGBC's Competency Framework includes seven Competency Categories, which are categorical groupings of competencies or skills. The seven categories represent the essential areas in which Professional Engineers of all disciplines must have expertise in order to ensure effective practice and public safety. Each Competency Category contains a list of the Key Competencies required in that area.

The seven Competency Categories that applicants must demonstrate in order to achieve professional registration are:

- 1. TECHNICAL COMPETENCE**
- 2. COMMUNICATION**
- 3. PROJECT & FINANCIAL MANAGEMENT**

- 4. TEAM EFFECTIVENESS**
- 5. PROFESSIONAL ACCOUNTABILITY**
- 6. SOCIAL, ECONOMIC, ENVIRONMENTAL & SUSTAINABILITY**
- 7. PERSONAL CONTINUING PROFESSIONAL DEVELOPMENT (CPD)**

KEY COMPETENCIES

Key Competencies are defined as an identified skill-set or knowledge-base which the candidate must have attained to achieve professional registration. They are behavioural-type descriptions of what an applicant should demonstrate they have done in practice to meet the required level of expertise in each Competency Category. A successful candidate must meet each key competency to at minimum level one on the Competency Rating Scale (a training level), while achieving the required average level for each category as a whole, which varies from 2 to 3.

INDICATORS

Indicators are defined as specific examples of activities, actions, skills or behaviours that an applicant could use to demonstrate the existence and achievement of a competency. APEGBC provides a list of indicators for each Key Competency in order to help applicants to understand what types of examples are required to meet each requirement, or what specific knowledge-base, experience or skill they must develop before achieving registration. The indicators provided may be generic to all engineering disciplines (as in the case of Competency Categories 2-7) or discipline specific (Category 1). Indicators are listed under each Key Competency throughout the online system.

COMPETENCY RATING SCALE & COMPETENCE LEVEL

Achievement of each category is measured through a Competency Rating Scale that outlines six different levels of competence (0-5). The rating scale serves to set out the minimum level of competence required to satisfy the requirements for registration as a professional engineer. The overall level of competence required will be specified for each category, and candidates must have achieved at least level one in each Key Competency. A brief outline of each level appears in Table 1.

Table 1: Competency Rating Scale Summary

Level of competence	Short Description: Category 1	Short Description: Categories 2-6	Short Description: Category 7	Direct Supervision Required	Responsibility & Risk	Complexity of applicant's own work	Supervision & Development of others* *Category 1 Only
0	Little or no exposure to the competency	Little or no exposure to the competency	No CPD completed and/or planned; no gap analysis	N/A	N/A	N/A	N/A
1	Training Level: A general appreciation and awareness of the competency is required	Training Level: A general appreciation and awareness of the competency is required	Minimal amount of CPD completed and/or planned; CPD completed may not address professional competence; An incomplete gap analysis	Significant	minimal	minimal	none
2	Requires knowledge and understanding of objectives; Uses standard engineering methods and techniques in solving problems	At a level of limited experience; Carries out activities of limited scope and complexity; Requires knowledge and understanding of objectives	A marginal amount of CPD completed and planned; A marginal/insufficient gap analysis	considerable	some	Some	limited
3	Carries out assignments of	Approaching a professional level;	Adequate amount of CPD completed	some	considerable	moderate	some

	moderate scope and complexity; is typically seen to be prepared to assume professional engineering responsibilities.	Carries out activities of moderate complexity.	and/or planned; An adequate gap analysis				
4	Carries out responsible and varied assignments requiring general familiarity with a broad field of engineering and knowledge	Working at a professional level; carries out responsible and varied activities	A good amount of CPD completed and/or planned; a strong gap analysis	minimal	significant	considerable	some
5	Uses mature engineering knowledge; independent accomplishment, and coordination of difficult and responsible assignments	At a mature professional level; Independent coordination of difficult and responsible activities	Provides and demonstrates leadership in continuing professional development activities; a superior gap analysis	autonomous	total	significant	some

APPLICATION COMPONENTS

There are two main components that applicants must submit as part of their Competency-Based Assessment, both of which are submitted through the online system:

1. A brief, chronological **Work experience and Education History**. This provides a short form overview of an applicant's experience.
2. A **Competency Self-Assessment** using examples drawn from work experience to demonstrate achievement of each Key Competency

EXAMPLES

Applicants are asked to describe an example of their recent engineering activities that best demonstrates their achievement of each Key Competency, and divide their description into the categories of situation, action, and outcome. Brevity is encouraged. The examples that applicants select should reflect activities or projects in which they had responsibility and must be in the discipline of engineering indicated on their application.

REFERENCE REQUIREMENTS

An applicant's **Competency Self-Assessment** must be confirmed by their Validators (References). An applicant assigns each example to a Validator that has personal knowledge of the work described, ideally a P.Eng. Supervisor, and that Validator confirms the competence level they believe the applicant to have demonstrated. Validators also answer overall questions identical to those on APEGBC's current Reference Form. Applicants must provide a minimum of four Validators.

FURTHER QUESTIONS

More information about the Competency-Based Assessment and the online tool can be found here:

<https://www.apeg.bc.ca/Become-a-Member/Competency-Experience-Reporting-System>.

If you have any further questions regarding the Competency Based Assessment system, please contact Allison Brownlee at abrownlee@apeg.bc.ca.

1. Technical Competence (minimum overall competence level: 3)

Key

- 1.1** Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable
- 1.2** Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.
- 1.3** Analyze technical risks and offer solutions to mitigate the risks
- 1.4** Apply engineering knowledge to design solutions
- 1.5** Be able to understand solution techniques and independently verify the results.
- 1.6** Safety awareness: be aware of safety risks inherent in the design; and Demonstrate Safety Awareness – on-site and possible safety authorization/certificate as appropriate
- 1.7** Demonstrate understanding of systems as well as of components of systems
- 1.8** Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation
- 1.9** Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.
- 1.10** Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents

2. Communication (minimum overall competence level: 3)
Key
<p>2.1 Oral</p> <p>2.2 In Writing</p> <p>2.3 Reading and Comprehension</p>

3. Project and Financial Management (minimum overall competence level: 2)
Key
<p>3.1 Awareness of project management principles</p> <p>3.2 Demonstrate increasing level of responsibility for project planning and implementation</p> <p>3.3 Manage expectations in light of available resources</p> <p>3.4 Understand the financial aspects of their work</p> <p>3.5 Ask for and demonstrate response to feedback</p>

4. Team Effectiveness (minimum overall competence level 3)
Key
<p>4.1 Work respectfully and with other disciplines/people</p> <p>4.2 Work to resolve differences</p>

5. Professional Accountability (Ethics & Professionalism) (minimum overall competence level: 3)

Key

- 5.1 Work with integrity, ethically and within professional standards (Indicators: Comply with APEGBC's code of ethics; Apply professional ethics in meeting corporate directives)
- 5.2 Demonstrate an awareness of your own scope of practice and limitations
- 5.3 Understand how conflict of interest affects your practice
- 5.4 Demonstrate awareness of professional accountability
- 5.5 Demonstrate an understanding of appropriate use of the stamp and seal

6. Social, Economic, Environmental and Sustainability (minimum overall competence level: 2)

Key

- 6.1 Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts
- 6.2 Demonstrate an understanding of the relationship between the engineering activity and the public
- 6.3 Understand the role of regulatory bodies on the practice of engineering
- 6.4 Be aware of any specific sustainability clauses that have been added to practice guidelines that apply to their area
- 6.5 To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in his/her specific work

7. Personal Continuing Professional Development (minimum overall competence level: 3)

Key

- 7.1** Demonstrate completion of professional development activities
- 7.2** Demonstrate awareness of gaps in knowledge and areas requiring further development
- 7.3** Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice

GENERIC TECHNICAL COMPETENCE INDICATORS

Competency Category 1 – Technical Competence		Overall Level: 3
Competencies		
1.1	Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable	<ol style="list-style-type: none"> 1. <i>Identify and comply with legal and regulatory requirements for project activities.</i> 2. <i>Incorporate knowledge of codes and regulations in design materials.</i> 3. <i>Prepare reports assessing project compliance with codes, standards, and regulations.</i> 4. <i>Recognize the need to design for code compliance while achieving constructability.</i>
1.2	Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> 1. <i>Demonstrate knowledge of materials, operations, project and design constraints, e.g. cost, design, material, labour, time, budget, production.</i> 2. <i>Demonstrate understanding of and coordination with other engineering and professional disciplines.</i>
1.3	Analyze technical risks and offer solutions to mitigate the risks	<ol style="list-style-type: none"> 1. <i>Demonstrate familiarity with system protection and/or damage/hazard mitigation</i>

		<p><i>objectives, philosophies, practices, procedures, and functions.</i></p> <ol style="list-style-type: none"> 2. <i>Identify risk areas including causes of risks and their impacts.</i> 3. <i>Develop risk management/mitigation plans.</i> 4. <i>Demonstrate an understanding of the difference between technical risk and public safety issues.</i>
1.4	Apply engineering knowledge to design solutions	<ol style="list-style-type: none"> 1. <i>Prepare technical specifications.</i> 2. <i>Demonstrate use of theory and calculations to arrive at solutions.</i> 3. <i>Demonstrate the development of a unique design solution which could not be accomplished with a standard design solution.</i>
1.5	Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> 1. <i>Demonstrate an understanding of the engineering principles used in the application of computer design programs and show/describe how the results were verified as correct.</i> 2. <i>Participate in an independent review and verification of solution techniques or analysis methods.</i>

1.6	Safety awareness: be aware of safety risks inherent in the design; and Demonstrate Safety Awareness – on-site and possible safety authorization/certificate as appropriate	<ol style="list-style-type: none"> 1. <i>Identify, incorporate, and/or participate in review of safety considerations, safety procedures and safety equipment as they apply to system operations and/or maintenance programs.</i> 2. <i>Demonstrate specific knowledge of safety regulations.</i> 3. <i>Incorporate explicit human and public safety considerations in design and all other professional activities.</i> 4. <i>Understand and account for safety risks associated with processes. Identify relevant protection equipment and process modifications to mitigate safety risks.</i>
1.7	Demonstrate understanding of systems as well as of components of systems	<ol style="list-style-type: none"> 1. <i>Demonstrate an understanding of each element in a process.</i> 2. <i>Demonstrate and understanding of the interactions and constraints in the behavior of the overall system.</i> 3. <i>Manage processes within the overall system (monitor and, where needed, modify processes to achieve optimum outcomes).</i>
1.8	Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation	<ol style="list-style-type: none"> 1. <i>Demonstrate awareness of project concerns and roles of other stakeholders in the project stages:</i> <i>I Identification: generation of the initial project idea and preliminary design</i> <i>II Preparation: detailed design of the project</i>

		<p><i>addressing technical and operational aspects</i></p> <p><i>III Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives</i></p> <p><i>IV Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work</i></p> <p><i>V Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback</i></p> <p><i>VI Evaluation: periodic review of project with feedback for next project cycle.</i></p>
1.9	Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.	<ol style="list-style-type: none"> 1. <i>Conduct checks, including field checks, to verify the validity of design.</i> 2. <i>Complete Quality Management Plan Checklist, and follow Quality Management Plan.</i> 3. <i>Prepare quality control plans, including frequency and test parameters, for specific processes or products.</i> 4. <i>Evaluate test results, determine adequacy, and develop recommended action.</i> 5. <i>Demonstrate peer review.</i> 6. <i>Demonstrate completed project, systems or sub-systems meet project objectives in terms of functionality and operational performance.</i>

1.10

Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.

1. *Ability to review designs of others and communicate findings and issues, including suggested alternatives.*
2. *Demonstrate communication of ideas and concepts to project team members.*
3. *Demonstrate understanding of value of project completion reports and lessons learned reports to application in future projects by self or others.*
4. *Produce sketches, notes, documentation and design documents to prepare proposals, preliminary, and final design drawings for acceptance by the client and approval by regulatory authorities.*

GENERIC INDICATORS

Competency Category 2 – Communication

Overall Level: 3

Competencies

2.1

Oral

1. *Communicate in a simple and concise manner.*
2. *Communicate official project data with team members, clients, contractors*
3. *Ability to express both technical and non-technical issues and ideas clearly to both technical and non-technical personnel.*
4. *Presentations to technical and non-technical groups; presentations to superiors and subordinates; internal (colleagues) and external (clients) presentations*
5. *Presentation of project parameters to the public*
6. *Demonstrate active participation in and contribution to meetings*

2.2	In Writing	<ol style="list-style-type: none">1. <i>Tailor communications to the intended audience.</i>2. <i>The ability to write and review technical documents</i>3. <i>Ability to write clear memos and reports to both technical and non-technical personnel.</i>4. <i>Use drawings and sketches to demonstrate key points and concepts</i>5. <i>Demonstrate a written report on a technical subject</i>6. <i>Demonstrate a written report on field observations</i>7. <i>Take training in technical report writing</i>8. <i>Work with common office programs (e.g. Excel, Word, Outlook, internet browsers)</i>
2.3	Reading and Comprehension	<ol style="list-style-type: none">1. <i>The ability to review technical documents, to understand the implications and to summarize key points.</i>

Competency Category 3 – Project and Financial Management

Overall Level: 2

Competencies

3.1

Awareness of project management principles

1. *Awareness of resource planning, budgeting, change management, scope management, schedule and unforeseen issues in managing a project from start to end.*
2. *Understand the impacts that benefits and risks of various design solutions have on a project*
3. *Understand the needs and expectations of internal and external clients*

3.2

Demonstrates increasing level of responsibility for project planning and implementation

1. *Follow and contribute to development of project management plans*
2. *Be aware of future improvements and demands as well as other ongoing projects.*
3. *Demonstrate increasing responsibility for client contact and management*
4. *Demonstrate how project planning activities and interaction with others has*

		<p><i>increased over the training period.</i></p> <p>5. <i>Participate in managing and adapting a schedule.</i></p> <p>6. <i>Demonstrate awareness of issues related to other disciplines that might affect the project, maintaining contact and communication to discuss and resolve issues.</i></p>
3.3	Manage expectations in light of available resources	<p>1. <i>Update schedule and budget on regular basis and communicates status</i></p> <p>2. <i>Provide market assessment and availability of materials for a project.</i></p> <p>3. <i>Meet deadlines</i></p>
3.4	Understand the financial aspects of their work	<p>1. <i>Demonstrate cognizance of project budget during design and construction</i></p> <p>2. <i>Provide technical/financial report and compare the options.</i></p> <p>3. <i>Demonstrate the understanding of the place of finance in business decisions</i></p> <p>4. <i>Understand principles of budgeting and financing</i></p> <p>5. <i>Understand the relevant business processes</i></p> <p>6. <i>Demonstrate an understanding of working with and developing contracts</i></p>

3.5	Ask for and demonstrate response to feedback	<ol style="list-style-type: none"> 1. <i>Demonstrate implementation of lessons learned, and performance reviewed in meetings</i> 2. <i>Show willingness to accept comments and criticism</i> 3. <i>Identify situations where you received feedback and how you responded to that feedback.</i> 4. <i>Demonstrate appreciation of the scope of a project and an appropriate response when a project varies beyond the scope.</i>
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Competency Category 4 – TEAM EFFECTIVENESS	Overall Level: 3
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Competencies	
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4.1	Work respectfully and with other disciplines/people	<ol style="list-style-type: none"> 1. <i>Demonstrate respect for others' responsibility and expertise.</i> 2. <i>Integrate engineering with other professional input.</i>
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		<ol style="list-style-type: none"> 3. <i>Participate actively in team discussions.</i>
4.2	Work to resolve differences	<ol style="list-style-type: none"> 1. <i>Demonstrate leadership in achieving team goals and resolving conflict.</i> 2. <i>Work to facilitate beneficial conflict resolution.</i> 3. <i>Exposure to training in conflict resolution.</i>

**Competency Category 5 – PROFESSIONAL ACCOUNTABILITY
(ETHICS & PROFESSIONALISM)**

Overall Level: 3

Competencies

5.1	Work with integrity, ethically and within professional standards	<ol style="list-style-type: none"> 1. <i>Comply with APEGBC's Code of Ethics</i> 2. <i>Apply professional Ethics in meeting corporate directives</i>
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5.2	Demonstrate an awareness of your own scope of practice and limitations	<ol style="list-style-type: none"> 1. <i>Ask for help and incorporate input</i> 2. <i>Demonstrate interaction with your supervisor</i> 3. <i>Ask questions when needed</i> 4. <i>Attend APEGBC AGM</i> 5. Structural applicants only: <i>Understand the role of the StructEng</i>
5.3	Understand how conflict of interest affects your practice	
5.4	Demonstrate awareness of professional accountability	<ol style="list-style-type: none"> 1. <i>Awareness of the potential professional liability involved in all aspects of the design, construction and inspection process.</i> 2. Structural applicants only: <i>Understand the role of the StructEng and Independent Peer Reviews of work</i>
5.5	Demonstrate an understanding of appropriate use of the stamp and seal	
5.6	Understand own strengths/weaknesses & know how they apply to one's	<ol style="list-style-type: none"> 1. <i>Prepare a self criticism list and the ways to</i>

	position	<i>mitigate or eliminate the weaknesses</i>
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Competency Category 6 – SOCIAL, ECONOMIC, ENVIRONMENTAL AND SUSTAINABILITY	Overall Level: 2
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Competencies		
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6.1	Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts	<ol style="list-style-type: none"> 1. <i>Prepare public safety regulations and advice during design and implementation of a project.</i> 2. <i>Understand potential effects of Climate Change</i>
6.2	Demonstrate an understanding of the relationship between the engineering activity and the public	<ol style="list-style-type: none"> 1. <i>Recognize the value and benefits of the engineering work to the public</i> 2. <i>Prepare a report regarding the impact of a project to public.</i>

6.3	Understand the role of regulatory bodies on the practice of engineering	<ol style="list-style-type: none"> 1. <i>Recognize the importance of respecting the regional traditions and native regulations towards a project.</i> 2. <i>Understand the role and regulations of other professions whose practices overlap or interface with the practice of professional engineering</i>
6.4	Be aware of any specific sustainability clauses that have been added to practice guidelines that apply to their area	
6.5	To the extent possible, recognizing the applicant’s position of influence, consider how sustainability principles could be applied and promoted in his/her specific work	<ol style="list-style-type: none"> 1. <i>Include sustainability analysis in project descriptions.</i> 2. <i>Provide a list of revisions made during design and implementation period of the project.</i>

Competency Category 7 – PERSONAL CONTINUING PROFESSIONAL DEVELOPMENT

Overall Level: 3

Competencies

7.1	Demonstrate completion of professional development activities	<ol style="list-style-type: none">1. <i>Participation in Community, Technical, Industry and/or professional association committees and task forces</i>2. <i>Engagement in a variety of self-directed and formal professional development activities to learn and maintain currency in field of practice and report progress to applicable parties</i>
7.2	Demonstrate awareness of gaps in knowledge and areas requiring future development	<ol style="list-style-type: none">1. <i>Gap analysis of knowledge and skills; highlight the 'gaps' that exist</i>2. <i>Identification of areas of weakness where additional training is needed</i>

7.3

Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice

1. *Plan to pursue training in areas of weakness and remedy gaps in knowledge*
2. *Planned activities may include in a variety of self-directed and formal professional development activities to learn and maintain currency in field of practice*