

Engineers Canada

Core Engineering Competencies

A. Apply engineering knowledge, methods and techniques
Definition
Solves engineering problems using appropriate theoretical and practical engineering principles.
Indicators
<p>Defines potential issues or opportunities.</p> <p>Collects and analyses relevant data.</p> <p>Identifies alternate solutions based on feasibility, technology and economic assessments.</p> <p>Develops solutions that achieve system requirements and specifications.</p> <p>Selects and applies appropriate testing methodologies and techniques to verify that solutions meet specifications, codes and standards.</p> <p>Implements engineering solutions.</p> <p>Evaluates effectiveness of engineering solutions (i.e., practicality, constructability).</p>

Note: This competency is about assessing an applicant's ability to solve engineering problems (by identifying alternate solutions) and whether they have been exposed to the design lifecycle.

B. Use engineering technology, tools and equipment
Definition
Uses appropriate technology and engineering tools based on sound understanding of engineering principles.
Indicators
<p>Selects relevant technology for solutions to engineering problems.</p> <p>Uses, or monitors the use of, technology to solve engineering problems.</p> <p>Verifies the reliability of the use of technology, tool or equipment.</p> <p>Verifies the effectiveness of the use of technology, tool or equipment.</p> <p>Evaluates the limitations of the technology and how it can be applied.</p> <p>Understands the underlying principles behind the technology and its application.</p>

Note: This competency addresses both the "hands-on" aspect of engineering and demonstration of field experience, as well as the importance of using up-to-date technology, tools and equipment.

C. Safeguard public safety
Definition
Practises engineering activities holding paramount the safety, health and welfare of the public; the protection of the environment; and the safeguarding of economic interests.
Indicators
<p>Adheres to legislations, regulations and policies within all jurisdictional levels.</p> <p>Complies with all applicable codes and standards.</p> <p>Assesses risks and safety concerns of engineering activities to identify hazards and potential harm.</p> <p>Implements practices to protect health and safety of the public.</p>

Note: Reference to the public in this competency includes oneself and colleagues

D. Recognize the impacts of engineering on the environment, economy and society

Definition

Develops engineering solutions that are based on a sound understanding of their impacts on the environment, economy and society.

Indicators

Identifies the types of assessments and consultations required.
Assesses, to the extent possible, long term environmental and sustainability issues associated with engineering activities.
Assesses, to the extent possible, the economic and social impacts of engineering.
Recommends engineering solutions that consider assessment findings.

Note: The word “develops” is used to highlight the fact that solutions may be proposed, but not implemented. This competency addresses the professional engineer’s responsibility to consider the social implications of engineering activities.

E. Manage engineering activities

Definition

Applies the principles of sound management when conducting engineering activities including individual work.

Indicators

Conducts activities with an accurate understanding of expectations and needs.
Develops or implements schedules or budgets.
Manages the interplay of schedule, resources, quality and budget.
Manages risks.
Measures outcomes.

Note: This competency addresses the importance of proper work management practices – for projects or for individual undertakings.

F. Communicate engineering information

Definition

Effectively communicates engineering information verbally, graphically and in writing.

Indicators

Tailors communications to the audience and clarifies complex and technical information.
Presents information clearly and concisely.
Verifies audience’s understanding.
Listens actively and confirms own understanding.
Prepares correspondence, reports, records, or drawings.
Keeps clear and comprehensive records of engineering decisions, and supporting documentation (e.g. design record).

Note: This competency goes beyond language skills to address two-way communication. Applicants who do not communicate verbally due to a disability would demonstrate “verbal” communication through another interactive form of communication (i.e. sign, voice output communication aids, etc.)

G. Work collaboratively in a Canadian environment

Definition

Works effectively within the Canadian context to achieve societal, organizational and project goals in a collaborative manner.

Indicators

Shares relevant information, key knowledge and expertise with others.
Respects contributions of other professionals and colleagues at all levels.
Offers assistance to others when needed.
Resolves difficult interpersonal situations using tact and honesty.
Handles disagreement promptly, seeking mutually agreeable solutions.
Demonstrates sensitivity, and respect in interactions with diverse individuals and groups in ways that advance the achievement of team or organizational goals.

Note: This competency addresses the ability to work with diverse groups, demonstrating the respect and professionalism necessary to succeed in a Canadian environment.

H. Maintain and Enhance Engineering Skills and Knowledge

Definition

Takes actions to maintain and enhance proficiency in the practice of engineering activities.

Indicators

Addresses inadequacies in knowledge and skills through further study and consultation with others.
Engages in continuous learning activities (e.g., professional readings, courses, self-study, receiving coaching or mentoring, experiential learning).
Integrates general knowledge of current events and issues to one's own engineering practice.
Keeps current with the dynamic nature of engineering (including advances in knowledge and technological advancements).
Conducts self assessment.
Develops learning plan.

Note: This competency addresses the importance of keeping skills up-to-date, keeping current with the dynamic nature of engineering, and addressing any gaps through continuous learning.