# GENERAL – TECHNICIAN (GLON 2021~~4~~3)

## Preamble

The Canadian Technology Standards (CTS) are a collection of learning outcomes for Canada's engineering technology and applied science profession at the technician and technologist level.

## Stakeholders

The CTS may be utilized by accreditation bodies, provincial professional associations, educational institutions, government agencies, industry and others for the purposes accreditation, certification and other applications.

## Educational Programs

The General CTS is relevant to all programs at the technician level.

## Definitions

**Well-defined engineering problems –** Engineering problems that require practical engineering knowledge as defined by the discipline. This knowledge supports engineering design and operations through the application of engineering technologies applicable to the discipline. For further reference, see International Engineering Alliance ***Graduate Attributes & Professional Competencies***.

**Commented [SM1]:** DA2 graduate attribute

## Learning Outcomes

This CTAC list Discipline Learning Outcomes (DLO) which describe the significant and essential learning that students have achieved and can reliably demonstrate at the time of graduation. Each DLO has a number of Learning Outcome Indicators (LOI), which are examples illustrating, defining and clarifying the level of performance expected. The list of LOI is not comprehensive and there may be other indicators which can be used to assess achievement of learning outcomes.

DLO and their LOI employ only cognitive domain verbs selected from a table of cognitive verbs modeled after a Bloom's cognitive domain table of verbs adapted

 

specifically for engineering technology and applied science disciplines.

**Graduate Capability**

Students graduating from an accredited program have demonstrated achievement of all general learning outcomes, including a prescribed level of math, and discipline learning outcomes selected by the program.

Having completed a program that is based on applied mathematics and scientific and engineering theory, principles and practices and having acquired the knowledge, skills and attitudes to function in the work place, graduates are;

- able to evaluate assignments, establish objectives, set parameters and determine appropriate procedures and actions.
- able to exercise due diligence in the workplace and adhere to related practices, applicable laws and health and safety practices.
- able to work in accordance with labor-management principles and practices.
- able to work independently or interdependently as part of a discipline or multi-disciplinary team.
- prepared to assume responsibility for their work.

**Graduate Career Opportunities**

Graduates of engineering technician and applied science programs have career opportunities in such areas as: business, industry, construction, government, and public organizations. They may find employment in careers such as: design / maintenance of equipment, processes, infrastructure, or systems; preparation of specifications, drawings, or instructions; quality operations; construction supervision, contract inspection and administration; operations and maintenance; field and customer service; estimating; technical sales; supervision of projects; training activities; and many other areas.

 

## General Learning Outcomes (GLOs)

**GN01 Communication**

- Communicate clearly, concisely and correctly in writing and orally.

Learning Outcome Indicators include:

1.1 Prepare communications according to the purpose and the audiences.
1.2 Use proper language and style suitable to the context and task.
1.3 Demonstrate the practice of good technical writing.
~~1.3~~1.4 Demonstrate effective communications when giving and receiving instructions.

Commented [SM2]: DA10 graduate attribute

**GN02 Mathematical Techniques**

- Solve applied science and/or engineering technical problems applying a wide variety of mathematical techniques with the degree of accuracy required appropriate to the discipline.

Learning Outcome Indicators include:

2.1 Apply mathematical strategies (including models, geometric representations or formulas, elementary algebraic equations, descriptive statistical methods, and mathematical reasoning) for suitability and effectiveness.
2.2 Implement selected strategies and appropriate mathematical operations.
2.3 Estimate probable answers.
2.4 Perform mathematical operations accurately utilizing calculators or appropriate technical instruments.
2.5 Recognize errors in numerical answers and the appropriate fit between problems and answers.

**GN03 Teamwork**

- Collaborate with others in groups or teams that contribute to effective working relationships.

Learning Outcome Indicators include:

3.1 Outline strategies to accomplish the identified tasks.
~~3.1~~3.2 Demonstrate the strategies required to accomplish tasks as an individual or as part of a team.

Commented [SM3]: DA9 graduate attribute

~~3.2~~3.3 Identify roles for each member of the team.
~~3.3~~3.4 Employ equitable and fair treatment of team members
~~3.4~~3.5 Resolve conflicts employing techniques intended to bring about a mutually agreeable resolution.
~~3.5~~3.6 Examine the group's progress and make adjustments when necessary.

 

**GN04 Management and Business Principles**

- Demonstrate an awareness of the basic fundamentals of management and business principles in multidisciplinary environments.

Commented [SM4]: DA11 graduate attribute

Learning Outcome Indicators include:

4.1 Demonstrate an understanding of basic management principles.

4.2 Apply business principles as appropriate to the discipline.

~~4.2~~4.3 Apply financial principles as appropriate to the discipline.

Commented [SM5]: DA6 & DA11 graduate attributes

**GN05 Ethics, Sustainability, Contracts, and Codes**

- Recognize the fundamentals of ethics, sustainability, contract law, codes and standards.

Learning Outcome Indicators include:

5.1 Apply the professional Code of Ethics of the Provincial Professional Association or Society.

~~5.1~~5.2 Identify and explain legal, cultural and professional accountabilities in the workplace.

Commented [SM6]: DA6 & DA11 graduate attributes

~~5.2~~5.3 Resolve social, contractual and environmental issues, with respect to a project applying ethical reasoning.

~~5.3~~5.4 Recognize environmental sustainability issues.

~~5.4~~5.5 Describe the principles of sustainability.

~~5.5~~5.6 ~~Demonstrate~~ Investigate and demonstrate knowledge of codes and standards applicable to the discipline.

Commented [SM7]: DA4 graduate attribute

~~5.6~~5.7 Apply knowledge of contracts as appropriate for the discipline.

5.8 Maintain and apply confidentiality and privacy regulations, as well as other pertinent regulatory frameworks and/or compliancy requirements that apply to the discipline.

5.9 Work effectively as an individual or as a member of a work/project team.

Commented [SM8]: DA9 graduate attribute

~~5.7~~5.10 Explain the importance of continuous learning for ensuring ongoing professional competence and ethics.

Commented [SM9]: DA12 graduate attribute

**GN06 Graphical Communications**

- Access data and prepare reports, plans, specifications, sketches, graphics, drawings, and other technical documentation as appropriate by discipline.

Commented [SM10]: DA06 graduate attribute

Learning Outcome Indicators include:

6.1 Determine the appropriate source and type of data required, and develop appropriate strategies for data collection.

6.2 Conduct the taking of measurements and their documentation.

6.3 Examine data using systematic approaches to problem solving and decision-making.

6.4 Prepare sketches and/or drawings in accordance with discipline standards, formats, symbols and reference systems.

6.5 Prepare schematic diagrams appropriate for the discipline.

 

6.6 Produce plans, drawings, details and presentation graphics using CAD software.
6.7 Produce field sketches and notes.

 

**GN07 Computer Knowledge**

- Use computer hardware and software necessary to the performance of tasks within the discipline.

Learning Outcome Indicators include:

7.1 Determine when computers or other technology can enhance productivity, the completion of tasks, solving of problems, performing research and creating products.
7.2 Use basic computer operating systems and common application software competently.
7.3 Manipulate data using electronic communication systems.
7.4 Manage computer file systems.
7.5 Solve technical problems using technical computer application software common to the discipline.
7.6 Access and manipulate information using internet technologies.

**GN08 Health and Safety**

- Apply sound health and safety practices to minimize exposure to unsafe conditions and ensure a safe working environment for oneself and co-workers as ~~required~~appropriate by ~~the appropriate~~ discipline.

Commented [SM11]: DA3 graduate attribute

Learning Outcome Indicators include:

8.1 Apply health and safety legislation.
8.2 Describe legislation with respect to designated substances.
8.3 Describe legislation with respect to the transportation of dangerous goods.
8.4 Apply health and safety legislation with respect to accident prevention.
8.5 Analyze a workplace area and implement action to handle unsafe or hazardous situations.
8.6 Recognize the importance of safety and environmental inspections.
8.7 Employ safe working practices and work safely in a lab or shop environment.
8.8 Operate workplace equipment safely.

**GN09 Engineering Fundamentals**

- Apply knowledge of engineering fundamentals to wide practical engineering procedures, processes, systems or methodologies.

Learning outcome indicators include:

9.1 Apply knowledge in materials and methods of construction/manufacturing as determined by the discipline of study.
9.2 Apply knowledge in design of systems, tools, components, structures or other discipline related requirements.
9.3 Apply knowledge in measurement techniques and equipment and analysis tools as determined by the discipline of study.

 

9.4 Apply knowledge in test protocol and sampling determination as determined by the discipline of study.

Commented [SM12]: DA1 graduate attribute

**G~~Y~~N010 Engineering Tools**

- Apply a variety of engineering tools necessary to the performance of tasks within the discipline.

Learning Outcome Indicators include:

10.1. Apply the appropriate measurement tools for the task and ensure the results are validated.

10.2. Apply the appropriate computer-aided design and drafting (CAD tools (2D vs 3D) for the task and ensure the results are validated for further requirements in construction, manufacturing and approval submittal processes.

10.3. Apply appropriate machining, manufacturing and forming equipment and processes for the task, ensuring selection is made on best practices and industry requirements.

10.4. Apply the appropriate sampling type, quantity and methodology and ensure the results are validated.

10.5. Apply appropriate simulation tools for the task, evaluate the results and ensure the results are validated.

Commented [SM13]: DA5 graduate attribute