CIVIL – TECHNICIAN (CVTN 2021)

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, program development and other applications.

Educational Programs

The Civil CTS is relevant to programs including, but not limited to, transportation, municipal, structural, geotechnical, hydrological, water resources, coastal and site engineering at the at the technician level.

Learning Outcomes

This CTS 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 Civil Engineering Technology - Technician 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.

Discipline Learning Outcomes (DLOs)

CVTN01 Collect Data

- Collect civil engineering data from existing graphics, reports, and other documents.

Learning Outcome Indicators include:

1.1 Identify and review criteria for project and appropriate information sources.
1.2 Interpret, collect, review and check data by using systematic approaches to problem-solving and decision-making in accordance with recognized standards and practices.
1.3 Collaborate in proposing recommendations to appropriate team members.
1.4 Collect civil engineering data utilizing systematic approaches and paper-based and computerized techniques.

CVTN02 Processing and Interpretation of Data

- Collaborate in the collection, processing, and interpretation of technical data related to civil engineering work.

Learning Outcome Indicators include:

2.1 Measure, record, and evaluate technical data as an active member of the team.
2.2 Select and operate a variety of civil engineering-related equipment.
2.3 Demonstrate that data collected are within expected parameters of accuracy.
2.4 Process and document civil engineering data by using computers and appropriate software correctly.
2.5 Collect data relevant to potential and actual relationships between civil engineering projects and their physical environments (e.g., air, water, soil).

CVTN03 Document Control

- Communicate information effectively and accurately by interpreting, translating, and producing civil engineering documents.

Learning Outcome Indicators include:

3.1 Collect required information and data.
3.2 Prepare and modify documents according to established criteria and industry standards.
3.3 Employ appropriate techniques to produce documents for civil engineering projects.
3.4 Present civil engineering data to project stakeholders.
3.5 Construct models for civil engineering projects by using relevant paper-based and computer-assisted techniques.

CVTN04 Laws, Standards, Bylaws, and Codes

- Explain importance of working in compliance with applicable laws, standards, bylaws, and codes.

Learning Outcome Indicators include:

4.1 Collaborate in the review and preparation of typical contracts for compliance with basic legal principles and bidding process.
4.2 Apply sound health and safety-related legislation and practices.
4.3 Employ equipment, materials, and practices that comply with relevant laws, legislation, standards, codes, and bylaws.
4.4 Apply standard business and administrative principles and practices.
4.5 Collaborate in the preparation of estimates, tenders, and construction documents.
4.6 Employ ethical practices as outlined by professional associations.
4.7 Recognize labour management principles and practices.

CVTN05 Monitoring

- Collaborate in monitoring civil engineering work.

Learning Outcome Indicators include:

5.1 Identify phases of projects and their component activities.
5.2 Follow project schedules and cost estimates needed to complete each phase of work.
5.3 Monitor, document and report work activity.
5.4 Perform quality-assurance, sampling, and testing.
5.5 Monitor civil engineering projects using reports, minutes, field data, and field notes.
5.6 Contribute to identification and resolution of problems related to materials, scheduling, resources, and budgets in order to complete projects.
5.7 Perform quantity surveys and assist in cost estimates.
5.8 Collaborate in monitoring adherence to occupational health and safety regulations.

CVTN06 Operations

- Collaborate in designing, planning, inspecting, and constructing civil engineering projects.

Learning Outcome Indicators include:

6.1 Review technical criteria used in the design, layout, and construction of civil engineering projects.
6.2 Contribute effectively as a member of a project team in planning, implementing, and evaluating civil engineering projects.
6.3 Contribute to selecting appropriate criteria to design, inspect, and construct civil engineering projects.
6.4 Collaborate in monitoring financial resources, human resources, and time-lines used in civil engineering projects.

6.5 Use organizational and time-management strategies effectively in own work.
6.6 Contribute to the review of failure and accident reports.
6.7 Collaborate in creating deficiency lists and recommending solutions.
6.8 Recognize appropriate project management principles and methods.
6.9 Recognize the importance of health and safety factors in design and construction.

CVTN07 Evaluation of Equipment, Materials, and Methods

- Collaborate in the evaluation of equipment, materials, and methods employed in the completion of civil engineering projects.

Learning Outcome Indicators include:

7.1 Review specifications, limitations, use, and safety aspects of equipment and construction materials.
7.2 Test and calibrate a variety of equipment and facilitate repairs in order to complete various project tasks and to ensure equipment accuracy and operational safety.
7.3 Perform quality-assurance, sampling, and testing.
7.4 Document, plot, and collaborate in the interpretation of results of quality-assurance sampling and testing.
7.5 Report deficiencies to appropriate team members.
7.6 Monitor that equipment is used in own work according to manufacturer's recommended directions and relevant legislation.
7.7 Implement safety checks.
7.8 Monitor proper handling and use of materials.
7.9 Present costs/benefits of methods employed.

CVTN08 Technology Applications

- Support civil engineering projects using electronics technology.

Learning Outcome Indicators include:

8.1 Maintain currency with changes in technology that affect civil engineering.
8.2 Use electronic systems to select, store, and retrieve information.
8.3 Access and share information using electronic communications effectively.
8.4 Solve problems by applying knowledge of computers and application software.
8.5 Manage civil engineering data by using computers and appropriate software correctly.
8.6 Contribute to various phases of civil engineering projects using electronics technology.

CVTN09 Project Records

- Maintain project records, logs, drawings, and inventories.

Learning Outcome Indicators include:

9.1 Organize and collect project-related information according to approved techniques.
9.2 Maintain information in a retrievable manner by using appropriate filing methods.
9.3 Maintain ongoing, accurate project records, minutes, diaries, and accounts of civil engineering projects according to established formats, policies, and procedures.
9.4 Contribute to decision making, reporting, and quality assurance using collected and stored information accurately and effectively.
9.5 Monitor and report deficiencies and non-compliance with project specifications.
9.6 Monitor and report quality and cost deviations.
9.7 Collaborate with team in preparing and presenting technical reports, budget forecasts, and project estimates.

CVTN10 Project Coordination

- Recognize interdependence of architectural, structural, mechanical, and electrical disciplines relating to civil engineering projects.

Learning Outcome Indicators include:

10.1 Recognize the relationships among various disciplines involved in civil work.
10.2 Develop basic understanding of various disciplines involved in civil projects.
10.3 Recognize how architectural, structural, mechanical, and electrical disciplines influence planning, designing, and implementation of civil engineering projects.
10.4 Collaborate with multi-disciplinary teams to plan and execute civil work.