



ENVIRONMENTAL – TECHNICIAN (ENVTN 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 and other applications.

Educational Programs

The Environmental CTS is relevant to programs including, but not limited to, water and waste water, waste management, and environmental monitoring sampling or measurement 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 Environmental 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: maintenance of equipment, processes, infrastructure, or systems; preparation of specifications, drawings, or instructions; investigation and enforcement; operations; monitoring and sampling; field and customer service; technical sales; and many other areas.

Discipline Learning Outcomes (DLOs)

ENVTN01 Samples and Testing

- Collect and perform routine tests on environmental samples.

Learning Outcome Indicators include:

- 1.1 Perform specified sampling and/or analysis of air, soil, solids, and water matrices.
- 1.2 Collect and process samples for laboratory analysis.
- 1.3 Employ automatic and manual sampling equipment.
- 1.4 Use sampling and analytical equipment.
- 1.5 Prepare, preserve, handle, store, and ship samples for laboratory analysis.
- 1.6 Implement appropriate chain-of-custody procedures.
- 1.7 Prepare solutions, culture media, equipment, and instruments for analytical and experimental work.
- 1.8 Implement quality assurance and quality control protocol and safe work practices.

ENVTN02 Environmental Data

- Employ technology tools to assemble and utilize environmental data effectively.

Learning Outcome Indicators include:

- 2.1 Demonstrate proficiency in information management systems.
- 2.2 Demonstrate knowledge of electronic mail, the Internet, and/or other technology-based tools as resources for searching, collecting, and retrieving project-related information.
- 2.3 Use statistically supported software to organize, summarize, and present environmental project-related data.
- 2.4 Use computer simulation software to support data handling.

ENVTN03 Environmental Processes

- Apply basic engineering to environmental processes.

Learning Outcome Indicators include:

- 3.1 Demonstrate knowledge of unit operations, industrial processes, and physical, biological, and chemical control.
- 3.2 Apply principles of system instrumentation and monitoring to environmental projects.
- 3.3 Demonstrate a basic knowledge of geomatics including surveying.
- 3.4 Describe gaseous, liquid, and solid waste management systems, as well as methods of operation and control of such processes.
- 3.5 Describe water supply, treatment, and distribution systems.
- 3.6 Describe wastewater collection, treatment, and sludge handling systems.
- 3.7 Apply fundamental knowledge of fluid flow measurement.
- 3.8 Describe air emission control technologies.
- 3.9 Apply knowledge of hydrologic, hydro-geologic, and hydraulic principles.

ENVTN04 Environmental Projects

- Implement standard procedures for conducting environmental projects including use of appropriate equipment and materials.

Learning Outcome Indicators include:

- 4.1 Support planning and implementation of environmental projects collecting required information, data and materials.
- 4.2 Monitor, document, and report the results of bench, pilot, and full-scale tests.
- 4.3 Use equipment and supplies correctly in applying an established plan for environmental projects.
- 4.4 Use equipment and materials according to manufacturer's recommended directions.
- 4.5 Maintain equipment in safe working order.
- 4.6 Implement project work in a safe, efficient, and productive manner.

ENVTN05 Ecosystem-based Management

- Employ principles of ecosystem-based management for sustainability.

Learning Outcome Indicators include:

- 5.1 Relate cultural, economic, health, population, political, and social issues as they influence management of environmental systems.
- 5.2 Review regional ecosystems.
- 5.3 Describe contemporary theory and approach to management of physical and biological natural resources.

ENVTN06 Ethics

- Practice principles and ethics associated with environmental management issues.

Learning Outcome Indicators include:

- 6.1 Perform job related tasks in a manner consistent with those of professional associations and other relevant bodies related to environmental field.
- 6.2 Demonstrate strong ethical attitude towards all efforts to conserve, restore, and enhance the environment and ensure public safety.
- 6.3 Demonstrate a strong sense of integrity and ethical awareness.
- 6.4 Describe importance of local, national, and global environmental issues.
- 6.5 Recognize individual and societal concerns/issues relevant to environmental related-projects.
- 6.6 Recognize expectations and limitations of technology in solving environmental problems.

ENVTN07 Occupational Health and Safety

- Implement work in adherence to Occupational Health and Safety regulations.

Learning Outcome Indicators include:

- 7.1 Test equipment to ensure operational safety.
- 7.2 Demonstrate working knowledge of relevant legislation, regulations, and protocols, including Occupational Health and Safety Acts and Workplace Hazardous Materials Information Systems (WHMIS).
- 7.3 Discuss various biological, chemical, and physical hazards, and adhere to documented operational procedures for their use.
- 7.4 Apply health and safety protocols and procedures.

ENVTN08 Standards and Regulations

- Operate in compliance with applicable municipal, provincial, and federal standards.

Learning Outcome Indicators include:

- 8.1 Manage handling, storage and disposal of laboratory chemicals, biological waste, and operating equipment in accordance with current legislation and regulations relating to health, safety, and environmental protection.
- 8.2 Access and describe appropriate sources of information, including municipal, provincial, and federal standards, policies, regulations, and legislation associated with environmental project activities.
- 8.3 Recognize nature, intent, and influence of legislation to protect environment.
- 8.4 Apply due diligence in all aspects of environmental project-related work.

ENVTN09 Environmental Management Studies

- Contribute to the implementation of environmental management studies.

Learning Outcome Indicators include:

- 9.1 Prepare components of an environmental site assessment.
- 9.2 Apply knowledge of ISO Environmental Management Systems.
- 9.3 Distinguish various types of environmental audits.
- 9.4 Apply knowledge of fundamental components of Environmental Management Systems (EMS).

ENVTN10 Project Management

- Use project management support techniques.

Learning Outcome Indicators include:

- 10.1 Monitor and report on project-related issues including timelines and budgets.
- 10.2 Organize project-related information as instructed.
- 10.3 Modify schedules based on quality control issues and client changes.
- 10.4 Implement routine field procedures, monitoring, and testing.

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