



FORESTRY– TECHNICIAN (FRTN 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 Forestry CTS is relevant to programs including, but not limited to, forestry operations, protection and silvaculture, fish and wildlife management, recreation management, and environmental ecology 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 Forestry Technology - Technician programs have career opportunities in such areas as: business, industry, construction, government, and public organizations. They may find employment in forestry resources management careers such as: operations; development of programs, processes, infrastructure, or systems; maintenance of equipment or systems; interpretation or preparation of specifications, or instructions; project management; administration; field and customer service; supervision of projects; training activities; and other areas.

Discipline Learning Outcomes (DLOs)

FRTN01 Natural Resource Measurements

- Collaborate in conducting basic field measurements.

Learning Outcome Indicators include:

- 1.1 Use aerial photographs and operational maps for navigation, identifying tie points, and recognizing key features.
- 1.2 Use forest measurement equipment accurately and efficiently.
- 1.3 Prepare operational maps from field data.
- 1.4 Collaborate in conducting standard forest surveys, measurements, and sampling procedures.
- 1.5 Describe common survey and sampling methods.
- 1.6 Describe characteristics of sample.

FRTN02 Harvesting Operations

- Collaborate in planning, designing, inspecting, supervising, and constructing forest operations projects dealing with forest road construction, cut block layout, harvesting, and timber transportation. Assist with preparation of stand and operational plans.

Learning Outcome Indicators include:

- 2.1 Collect data for forest road and harvest permits.
- 2.2 Describe general techniques for road construction, maintenance, and deactivation related to transportation systems.
- 2.3 Identify potential environmental impacts of forest management activities.
- 2.4 Survey for and recommend appropriate drainage structures.
- 2.5 Describe principles for cut block planning and road location.
- 2.6 Describe appropriate equipment necessary for operational tasks related to transportation and harvesting systems.

FRTN03 Forest Protection

- Under direction, prepare, implement, and supervise hazard assessment activities.

Learning Outcome Indicators include:

- 3.1 Collaborate to assess and interpret existing land use plans and legislative directives that define forest values on a specific site.
- 3.2 Collaborate to prepare, implement, and supervise hazard assessment activities, hazard analysis activities, and hazard abatement.
- 3.3 Recognize common stand level signs and symptoms and identify probable agents for damages.
- 3.4 Prepare, implement, and supervise survey or monitoring activities to assess impact of significant insect, mammal, or disease damage in forest stands.
- 3.5 Identify specific protection issues, and recommend or implement appropriate management strategies and activities.

FRTN04 Silviculture

- Collect and examine relevant data and prepare plans and reports for artificial and natural stand establishment.

Learning Outcome Indicators include:

- 4.1 Describe basic silviculture systems.
- 4.2 Discuss silviculture obligations.
- 4.3 Discuss silviculture stand tending activities.
- 4.4 Describe the common surveys used to fulfill silviculture obligations.
- 4.5 Describe the components of typical silviculture surveys.

FRTN05 Geographic Information Systems

- Contribute to the interpretation of digital geospatial data using modern software and hardware tools.

Learning Outcome Indicators include:

- 5.1 Contribute to the evaluation and interpretation of geospatial data in a variety of traditional media types such as maps, plans, air photos, and satellite images.
- 5.2 Contribute to the evaluation and interpretation of digital geospatial data using modern software and hardware tools.
- 5.3 Perform geospatial queries on a digital data based on resource management constraints.
- 5.4 Manage data and resultant files in an organized and sustainable hierarchical file structure.
- 5.5 Produce hard copy mapping products using a variety of software and hardware combinations.
- 5.6 Demonstrate the ability to use data and tools in ethical way.

FRTN06 Recreational Land Management

- Assist in the planning and administration of recreational lands.

Learning Outcome Indicators include:

- 6.1 Evaluate and interpret existing land use plans and legislative directives that define recreational forest values on a specific site.
- 6.2 Prepare, implement, and supervise survey or monitoring activities to assess the impact of visitor management and impact strategies.
- 6.3 Prepare, implement, and supervise hazard assessment activities, hazard analysis activities, and hazard abatement, including appropriate search and rescue strategies and potential avalanche hazards.
- 6.4 Compile data collected from impact monitoring surveys.
- 6.5 Recommend recreational land management practices in the areas of site management, operational plans, visual management, and visitor management.

FRTN07 Range Management

- Collaborate in the planning and directing of range utilization consistent with other uses, and in the conservation of natural resources.

Learning Outcome Indicators include:

- 7.1 Identify plants important to range plant communities.
- 7.2 Collect data specific to and required for range management.
- 7.3 Contribute to the evaluation of the condition of range resources on forest land base.
- 7.4 Describe the range tenure system for public land use.

FRTN08 Resource Planning and Management

- Collaborate to assess legislative directives that define resource values and evaluate existing land use plans.

Learning Outcome Indicators include:

- 8.1 Collaborate to evaluate and interpret existing land use plans and legislative directives that define resource values on a specific site.
- 8.2 Collaborate to prepare and implement biodiversity and sustainable development plans at local and stand levels.
- 8.3 Prepare and implement the survey or monitoring activities to assess soil and water quality and quantity.

FRTN09 Natural Resource Policy and Law

- Explain the interface between respective visions for resource management held by industry, public, and interest groups.

Learning Outcome Indicators include:

- 9.1 Collaborate to evaluate and interpret existing Canadian Environmental law and policy, which can include Forestry Law and Natural Resources Laws for defined jurisdictions.
- 9.2 Conduct enforcement of acts such as the Fisheries Act and the authorizations available there under. Conduct environmental assessments and reviews of projects, and appeals both through Judicial Review and through the Environmental Appeal Board.
- 9.3 Recognize relevant concepts of constitutional jurisdiction, administrative law, and evolving role of First Nations.

FRTN10 Park Management and Safety

- Collaborate in the development and implementation of management and operational plans for the preservation and maintenance of recreational values.

Learning Outcome Indicators include:

- 10.1 Explain legislated directives for land use priorities in areas designated for park use.
- 10.2 Assess the impact of visitor management and impact strategies by preparing and implementing survey or monitoring activities.

- 10.3 Prepare and implement hazard assessment activities, hazard analysis activities, and hazard abatement, including appropriate search and rescue strategies.
- 10.4 Organize hazard assessment surveys for issues, such as wildlife encounters, weather severity, and fuel conditions related to wildfire risk.
- 10.5 Present recreational land management practices in areas of site management, operational plans, visual management, and visitor management.
- 10.6 Implement public notice and evacuation plans.
- 10.7 Collaborate to evaluate ecosystems and design public access facilities that minimize impacts.
- 10.8 Collaborate to evaluate impacts and generate mitigation and restoration plans.

FRTN11 Ecological Systems

- Explain legislated directives for land use priorities in sensitive areas and assist in prescribing techniques to minimize human impacts.

Learning Outcome Indicators include:

- 11.1 Classify ecosystems, vegetation succession status, forest stand structure, and dynamics, as well as landscape features.
- 11.2 Explain different levels of complexity and interrelationships between organisms in ecosystems.
- 11.3 Prepare ecosystem restoration plans for impacts such as wild land fire, entomology, and human usage.

FRTN12 Forest Fire Management

- Collaborate to analyze fire behaviour characteristics and related factors, specify appropriate firefighting suppression equipment, and create fire and fuel management plans.

Learning Outcome Indicators include:

- 12.1 Identify forest hazards and risk and implement basic preventative and protective actions.
- 12.2 Recognize, identify, and report fuel management concerns and hazards.
- 12.3 Collaborate to prepare and implement hazard assessment, hazard analysis, and hazard abatement.
- 12.4 Use appropriate firefighting equipment.
- 12.5 Describe the potential for fire management in relation to silviculture, wildlife habitat, ecosystem restoration, pest reduction, reducing hazard, and managing risk.
- 12.6 Identify and analyze factors influencing fire behaviour characteristics.
- 12.7 Conduct fuel assessments and make recommendations for management strategies.
- 12.8 Plan, organize, and construct fire control lines including fire crew organization, supervision, and safety on small fires.

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