



BIOTECHNOLOGY – TECHNICIAN (BSTN 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 Biotechnology CTS is relevant to programs including, but not limited to, cell biology, chemistry, physics, molecular biology, genetics, biochemistry, microbiology, and fermentation 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 Biotechnology - Technician programs may conduct physical, chemical, biochemical, and microbiological analyses in quality control in a broad range of industries such as food, cosmetics, pharmaceuticals, and environmental protection. They may find employment in careers such as: maintenance of equipment or processes; preparation of specifications, or instructions; quality operations; operations; field and customer service; technical sales; and many other areas.

Discipline Learning Outcomes (DLOs)

BSTN01 Maintain Laboratory Equipment

- Calibrate, use, and maintain laboratory equipment.

Learning Outcome Indicators include:

- 1.1 Test, configure, and calibrate new equipment.
- 1.2 Maintain service to manufacturer's specifications.

BSTN02 Diagnostics

- Diagnose operations.

Learning Outcome Indicators include:

- 2.1 Apply basic electrical and electronic principles to troubleshoot instruments.
- 2.2 Calibrate equipment to manufacturer's specifications.

BSTN03 Analyses

- Conduct quantitative and qualitative analyses and tests using appropriate laboratory procedures.

Learning Outcome Indicators include:

- 3.1 Operate, maintain, and calibrate equipment.
- 3.2 Conduct basic laboratory operations.
- 3.3 Prepare chemistry solutions using established protocols.
- 3.4 Conduct basic bioassay methods in enzymology, immunology, and microbiology.
- 3.5 Utilize chromatographic and electrophoretic procedures to purify macromolecules.
- 3.6 Analyze samples/test materials utilizing a variety of microscopic methods.

BSTN04 Cell Culture Procedures

- Conduct cell culture procedures.

Learning Outcome Indicators include:

- 4.1 Conduct cell transformation.
- 4.2 Prepare, maintain, and preserve plant, animal, and microbial cultures.
- 4.3 Prepare and dispose of culture media appropriately.
- 4.4 Collaborate in fermentation processes.

BSTN05 Molecular Biology

- Conduct basic molecular biology procedures for use in a quality-control research, product development, or manufacturing biotechnology environment.

Learning Outcome Indicators include:

- 5.1 Conduct extraction and purification of DNA.

- 5.2 Conduct DNA manipulations such as cloning/sub cloning, sequencing, and gene amplification.
- 5.3 Use basic DNA protein analysis computer software.
- 5.4 Conduct electrophoretic, blotting, and hybridization techniques.

BSTN06 Legislation and Regulations

- Conduct routine laboratory duties in compliance with law, legislation, regulations, policies, and procedures.

Learning Outcome Indicators include:

- 6.1 Apply good laboratory practices in accordance with accepted principles of quality assurance.
- 6.2 Employ ethical practices and standards.

BSTN07 Produce Scientific Data

- Prepare, maintain, and communicate scientific data effectively.

Learning Outcome Indicators include:

- 7.1 Produce and maintain accurate records using manual and computer-based methods.
- 7.2 Manipulate data using computer software, such as spreadsheet, database, or statistical software.
- 7.3 Conduct appropriate literature searches.
- 7.4 Produce short technical documents and presentations.
- 7.5 Present results clearly and concisely using oral, written, graphic, or electronic formats.

BSTN08 Workplace Safety

- Understand the importance of safe workplace practices.

Learning Outcome Indicators include:

- 8.1 Manage handling, utilization, and storage of chemicals in accordance with guidelines and safe practices.
- 8.2 Manage disposal of hazardous waste in compliance with government regulations.
- 8.3 Locate, operate, and maintain protective equipment.
- 8.4 Apply sound health, safety, and waste management procedures to meet requirements.

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