



MECHANICAL – TECHNICIAN (METN 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 Mechanical CTS is relevant to programs including, but not limited to, manufacturing, industrial, HVAC, mechatronics and robotics, thermodynamics, biomechanics, marine, aerospace, and automotive at the at the technician level.

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 Mechanical 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: Computer Aided Design and Drafting (CADD); maintenance of equipment, processes, infrastructure, or systems; preparation of specifications, drawings, or instructions; quality operations; operations and maintenance; field and customer service; estimating; technical sales; supervision of projects; training activities; and many other areas.

Discipline Learning Outcomes (DLO's)

METN01 Mechanical Systems

- Contribute to the analysis, design, and implementation of mechanical systems through the application of engineering principles.

Learning Outcome Indicators include:

- 1.1 Calculate and convert correctly in Imperial and SI measurement units using both manual methods and electronic technology.
- 1.2 Use engineering terminology correctly and accurately in written and oral communication.
- 1.3 Identify technical criteria necessary to design and construct components, processes, and systems.
- 1.4 Apply engineering principles to the analysis, construction, and testing of mechanical engineering projects.

METN02 Analysis of Components

- Conduct routine analysis of mechanical components, processes, and systems.

Learning Outcome Indicators include:

- 2.1 Perform routine analysis of mechanical components, processes, and systems including automated methods applying knowledge of conventional and electronic technologies.
- 2.2 Identify properties of materials and assess their responses in an engineering environment.
- 2.3 Use relevant information and appropriate techniques to construct models and conduct structural analyses.
- 2.4 Apply basic principles of mechanics, fluid mechanics, hydraulics, and pneumatics to analyze and solve problems.
- 2.5 Apply basic principles of control systems.
- 2.6 Apply basic knowledge of electricity and electronics.
- 2.7 Identify ergonomic considerations.

METN03 Technical Documents

- Prepare graphics and other technical documents to appropriate engineering standards.

Learning Outcome Indicators include:

- 3.1 Collect and interpret relevant information, data, and materials.
- 3.2 Organize and prepare documents in accordance with recognized standards.

- 3.3 Produce and modify engineering drawings employing conventional and computer-based drafting techniques.
- 3.4 Produce graphics employing freehand sketching techniques.
- 3.5 Prepare technical drawings and documents, including reports, used in the design of mechanical components, processes, and systems.

METN04 Design and Production

- Contribute to the design and production of mechanical components specifying manufacturing materials, processes, and operation.

Learning Outcome Indicators include:

- 4.1 Recognize the effects of manufacturing processes on materials and on the design and production of components.
- 4.2 Use systematic approaches to assist in the identification and resolution of technical problems in the manufacture of components.
- 4.3 Identify and apply material testing methods.
- 4.4 Support sourcing material, tools, equipment, supplies, and services related to production of components.
- 4.5 Support the manufacture of components applying knowledge of computer-aided manufacturing.
- 4.6 Build and test prototypes.

METN05 Manufacturing and Assembly

- Apply knowledge of machinery, tools, and other equipment used in manufacturing, assembly, and repair processes.

Learning Outcome Indicators include:

- 5.1 Distinguish the performance characteristics, limitations, potential, and safety aspects of machinery, tools, and other equipment.
- 5.2 Manufacture, finish, fabricate, assemble, install, and repair simple components to required specifications using machinery, tools, and equipment.
- 5.3 Identify and eliminate, where possible, potential hazards associated with a manufacturing process or end product.
- 5.4 Support the production of components by applying knowledge of computer-aided manufacturing techniques.
- 5.5 Support the manufacture of components applying knowledge of fabrication, joining, and assembly processes.
- 5.6 Demonstrate safe working practices.

METN06 Quality Control

- Conduct quality control and quality assurance procedures.

Learning Outcome Indicators include:

- 6.1 Review specifications applicable to engineering projects.
- 6.2 Monitor, document, and report compliance with appropriate quality assurance procedures and specifications.
- 6.3 Perform or arrange for quality-assurance sampling and testing.
- 6.4 Implement the collection and reporting of statistical data.
- 6.5 Use results of quality-assurance sampling and testing to make adjustments or changes to manufacturing processes.
- 6.6 Inspect components using appropriate measuring instruments.

METN07 Inventory and Records Systems

- Use and maintain inventory and records systems.

Learning Outcome Indicators include:

- 7.1 Use and maintain paper-based and electronic systems to store and retrieve information and to plan activities.
- 7.2 Maintain current, clear, and accurate project-related documents in accordance with appropriate organizational practices.
- 7.3 Use project-related records and inventories to prepare reports.

METN08 Computer Applications

- Support the engineering environment using computer hardware and software.

Learning Outcome Indicators include:

- 8.1 Use computer application software to resolve technical problems.
- 8.2 Apply file management techniques to access and store data.
- 8.3 Collect and exchange information using electronic technology.
- 8.4 Produce technical documents accessing and organizing information using computer hardware and software applications.
- 8.5 Support design and analysis within an engineering environment using computer applications.

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