COMPUTER SYSTEMS – TECHNICIAN (CSTN 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 Computer Systems CS is relevant to programs including, but not limited to, software application, computer hardware, computer systems, and computing devices 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 Computer Systems Technology - Technician programs have career opportunities in such areas as: business, industry, government, and public organizations. They may find employment in careers such as: maintenance of computing equipment, processes, infrastructure, or systems; preparation of specifications, or instructions; computer and computer systems diagnostics; customer service; technical sales; supervision of projects; training activities; and many other areas.

Discipline Learning Outcomes (DLOs)

CSTN01 Systematic Approaches and Diagnostic Tools

- Analyze and resolve information technology problems through the application of systematic approaches and diagnostic tools.

Learning Outcome Indicators include:

1.1 Analyze information technology problems and formulate solutions.
1.2 Implement a variety of systematic troubleshooting methodologies.
1.3 Assess and determine an appropriate course of action.
1.4 Develop and follow appropriate procedures and methodologies to resolve problems effectively and minimize risk of recurrence.
1.5 Monitor, review, and assess effectiveness of solution.
1.6 Document problem and solution and communicate results with others.
1.7 Use a variety of troubleshooting tools.
1.8 Implement solutions in timely and low-impact fashion.

CSTN02 Systems Support

- Support implementation and administration of computer systems.

Learning Outcome Indicators include:

2.1 Use a variety of data gathering techniques.
2.2 Conduct needs assessment and determine requirements for components of computer systems.
2.3 Apply knowledge of a variety of architectures to integrate components of computer systems.
2.4 Apply knowledge of a variety of hardware platforms and operating systems to the implementation and administration of computer systems.
2.5 Select and use appropriate tools and techniques to monitor and test effectiveness of system.
2.6 Produce clear and accurate project documents including detailed diagrams.
2.7 Apply knowledge of system programming and use appropriate system calls to create and manage processes, threads, and Inter-Process Communication (IPC).

CSTN03 Networking Solutions

- Support implementation and administration of networking solutions.

Learning Outcome Indicators include:

3.1 Use a variety of data gathering tools and techniques.
3.2 Conduct needs assessment and determine requirements for components of networks.
3.3 Apply knowledge of computer connectivity, networks, and telecommunications to implementation of networks (e.g., Internet, Intranet, local area networks, wide area networks, wireless devices, Voice over IP).
3.4 Apply knowledge of a variety of hardware platforms and operating systems to the implementation and administration of networks.

3.5 Select and use appropriate tools and techniques to monitor and test effectiveness of networks.
3.6 Produce clear and accurate reports including detailed diagrams.
3.7 Apply knowledge of various services available to fulfill needs of transmission of data while managing costs.
3.8 Use electrical, construction, and telecommunication codes and standards in the implementation of networking solutions.
3.9 Apply knowledge of network security to implementation and administration of networking solutions.

CSTN04 Troubleshoot Computer Systems

- Install, troubleshoot, and maintain computer systems.

Learning Outcome Indicators include:

4.1 Use troubleshooting techniques and applied knowledge of a variety of computer components to resolve technical problems.
4.2 Modify and upgrade computer systems to adapt to changing technological and organizational environment.
4.3 Install and configure a variety of client and server software applications.
4.4 Recognize and use a variety of file types.
4.5 Apply standard tools, techniques, and equipment to implement and troubleshoot computer systems.
4.6 Install, configure, and support applications used in the workplace, such as database management, word processing, spreadsheet, graphics, and communication software.
4.7 Access and use relevant technical information from a variety of sources.
4.8 Implement preventive maintenance procedures.
4.9 Document existing and newly implemented configurations and user settings while ensuring maintenance of historical documentation.

CSTN05 Network Components

- Install, troubleshoot, and maintain network components.

Learning Outcome Indicators include:

5.1 Utilize troubleshooting techniques and applied knowledge of a variety of network components and network management services to resolve technical problems.
5.2 Modify and upgrade networks to adapt to changing technological and organizational environment.

5.3 Configure and install a variety of client and server remote-access software applications.
5.4 Apply standard tools, techniques, and equipment to implement and troubleshoot network components.
5.5 Apply knowledge of basic functions of network administration.
5.6 Access and use relevant technical information from a variety of sources.
5.7 Appraise security implications of integrating information technology into global networks.

5.8 Document modifications and monitor effects on network performance.
5.9 Implement maintenance schedules.

CSTN06 Scripting Tools and Languages

- Utilize a variety of scripting tools and languages to automate routine tasks.

Learning Outcome Indicators include:

6.1 Apply basic knowledge of relevant scripting tools and techniques.
6.2 Use a variety of strategies to resolve routine scripting problems.
6.3 Apply basic knowledge of a variety of scripting languages.
6.4 Apply knowledge of new and current development tools.
6.5 Assess, select, and use appropriate tools and techniques to develop and maintain administrative scripts and task automation.
6.6 Present clear and accurate comments on script.
6.7 Apply knowledge of automation tools to deploy and migrate software applications and user configurations.

CSTN07 Data Storage

- Monitor data storage procedures designed to ensure integrity of information.

Learning Outcome Indicators include:

7.1 Maintain infrastructure to capture, store, and update information.
7.2 Implement and maintain data storage and retrieval systems.
7.3 Implement strategies for backup and recovery of information.
7.4 Apply information security protocols and procedures.
7.5 Implement schedules for archiving of data.
7.6 Recover user data from storage back-ups.
7.7 Implement established procedures for incident response and data recovery as required.

CSTN08 Security

- Apply knowledge of security issues to implementation of information technology solutions.

Learning Outcome Indicators include:

8.1 Apply knowledge of software and hardware firewalls.
8.2 Apply knowledge of anti-virus and anti-spamming software.
8.3 Detect and remove malicious software.
8.4 Monitor host behaviour and network activity with a view to ensuring a secure environment.
8.5 Conduct security updates while minimizing client downtime.
8.6 Recognize the role of physical security in the implementation of information technology solutions.
8.7 Implement procedures and policies for keeping security software up-to-date.
8.8 Apply knowledge of network services to minimize security threats to organization.
8.9 Assess security risks created through implementation of new information

technology solutions.

8.10 Manage sensitive information held by organization according to its assigned classification.
8.11 Apply knowledge of intrusion detection and prevention to networking environments.
8.12 Assist in evaluating and enforcing security-related policies and documents.
8.13 Apply knowledge of remote-access and wireless technologies to allow secure remote access to network and its resources.

CSTN09 Technical Support

- Support clients in an efficient and effective technical manner that promotes safe computing practices and reduces risk of issue recurring.

Learning Outcome Indicators include:

9.1 Develop environment of effective communication.
9.2 Manage client inquiries promptly.
9.3 Maintain professional and honest relationships with clients.
9.4 Apply knowledge of proper client service to maintenance of client relationship.
9.5 Operate to ensure satisfactory realization of client's expectations.
9.6 Recognize personal limits and seek assistance in a timely manner to resolve problems beyond own knowledge and skills.
9.7 Resolve issues incorporating practical education of clients.
9.8 Define problems and solutions in non-technical language.
9.9 Collect information from clients respectfully and tactfully.
9.10 Use judgement to balance organizational policies and procedures regarding technical support and level of client knowledge.
9.11 Present client with alternative and reliable sources of support information.
9.12 Document, with appropriate level of detail, each instance of customer support.
9.13 Maintain appropriate case-by-case documentation of solution applied.

CSTN10 Project Management

- Contribute to successful completion of a project by applying project management principles.

Learning Outcome Indicators include:

10.1 Collaborate in the planning, identification, scheduling, and assigning of tasks and resources involved in a project as required.
10.2 Contribute to monitoring of resources and expenditures to maintain cost effectiveness and timelines as required.
10.3 Assemble project updates regularly.
10.4 Estimate accurately time required to complete project elements.
10.5 Implement project elements according to schedule.
10.6 Utilize project-planning documents.
10.7 Identify problems that will affect project timelines and recommend changes as soon as possible.
10.8 Maintain current, clear, and accurate project-related documents, which adhere to organization and industry standards and procedures.

