

**Legend**

**X** The standard is clearly addressed by program activities.

- This standard potentially could be addressed as part the program either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

Module Abbreviations			
WS	Starting with Workforce Skills	PS	Project Sprints and Competition
DG	Designing for the Game	I4	Industry 4.0 and Your Community
BR	Building and Programming a Basic Robot	SJ	Sensors Machine Learning and Java
MM	Machines to Mechanisms	I2	Improving through Iteration II
I1	Improving through Iteration I	LC	Learning and Pathways and Career Exploration

TEJ3M	Computer Technology Fundamentals Expectations	WS	DG	BR	MM	I1	PS	I4	SJ	I2	LC
Computer Hardware	A1.1 describe how the internal components of a computer function (e.g., CPU, mainboard, disk drives, RAM, chipset, video card, sound card, expansion slot);			X				X	X		
	A1.2 describe various standards for connecting computer components (e.g., parallel port, RS-232, USB, IEEE 1394, VGA, DVI);			X		X		X	X		
	A1.3 describe trends in the development of computer hardware (e.g., size, cost, and speed of processors, memory, and hard drives; video resolution; capacity of optical disks).							-			
Computer Systems	A2.1 describe the essential functions and other features of various operating systems (e.g., functions: management of resources, files, processes, and applications; features: services, usability, performance, applications such as text editor, web browser, or media player);	-	-	-	-	-	-	-	-	-	-
	A2.2 describe changes that may be required when upgrading hardware components or features of a computer system (e.g., BIOS updates, installation of drivers for new hardware, resolution of compatibility issues);			X							
	A2.3 describe the essential functions performed by the BIOS firmware in computer systems (e.g., POST [power on self test], boot sequence, hardware recognition, detection of master boot record);			X							
	A2.4 describe how the BIOS, hardware, and operating system of a computer interact.			-							

<b>TEJ3 M</b>	<b>Computer Technology Fundamentals Expectations</b>	WS	DG	BR	MM	I1	PS	I4	SJ	I2	LC
Electronic, Robotics, and Computer Interfacing	A3.1 identify and describe the functions of electronic components (e.g., resistor, capacitor, diode, LED)			x		x			x	x	
	A3.2 describe the function of electrical devices used in control systems (e.g., stepper motor, direct-current motor, touch sensor, accelerometer, optical sensor, power supply);			x		x			x	x	
	A3.3 calculate the values of components in electronic circuits using fundamental laws (e.g., Ohm's law, Kirchhoff's laws);			-							
	A3.4 explain the importance of advances in electronics (e.g., compare size, cost, and performance of vacuum tubes, transistors, and integrated circuits);							-			
	A3.5 compare the advantages and disadvantages of interfacing using desktop computers, microcontrollers, and programmable logic controllers			x		x		x	x	x	
Networking Concepts	A4.1 explain fundamental network concepts (e.g., bandwidth, throughput, full duplex, half duplex);										
	A4.2 explain the fundamental aspects of TCP/IP addressing as it pertains to workstations on a network (e.g., workstation IP address, subnet mask, MAC [media access control] address, default gateway address);			-				-			
	A4.3 describe various services offered by servers to network clients (e.g., HTTP, FTP, SMTP, telnet, printing, file transfers and storage, login);			-				-			
	A4.4 describe methods for making a network secure (e.g., firewalls, data and password encryption, user authentication, WEP or WPA keys, security of server room).			-				-			
Data Representation and Digital Logic	A5.1 describe binary and hexadecimal numbers, and convert positive integers among decimal, binary, and hexadecimal number systems;										
	A5.2 compare binary and hexadecimal representation of addresses and data (e.g., absolute addressing, character codes, colours);										
	A5.3 relate Boolean algebra to the fundamental logic gates and to combinations of these gates, using symbolic, algebraic, and numeric representation								x		

TEJ3M	B. Computer Technology Skills	WS	DG	BR	MM	I1	PS	I4	SJ	I2	LC
Hardware Solutions	B1.1 build a computer from parts to meet specified requirements (e.g., for gaming, business, entertainment, media centre, or graphic design);										
	B1.2 use correct procedures to prevent damage to sensitive components (e.g., use anti-static wrist straps and mats, disconnect power when inserting expansion cards);	-	-	-	-	-	-	-	-	-	-
	B1.3 install and configure peripheral devices in a computer system (e.g., printer, video camera, external drives);								X		
	B1.4 document maintenance and troubleshooting of computer hardware on a day-to-day basis (e.g., use a journal or log to record work done, time taken, problems found, solutions attempted, and results).	X		X	X	X	X	X	X	X	X
Computer Systems	B2.1 set up and configure a home office system (e.g., computer, scanner, printer, appropriate software);										
	B2.2 use system utilities for optimization and backup (e.g., defragment files; scan hard drives for defective sectors; run complete, incremental, and differential backups);										
	B2.3 configure a computer system to use multiple operating systems (e.g., dual boot, virtual machines).										
Electronic, Robotics, and Computer Interfacing	B3.1 use a design process (see pp. 22–23) to design and safely construct and test interfacing or robotics circuits (e.g., for LED traffic lights, VU meter, alarm system, or motor control), using appropriate materials and techniques, including soldering;	-	-	-	-	-	-	-	-	-	-
	B3.2 troubleshoot an electronic circuit using appropriate methods and test equipment (e.g., methods: isolation and substitution of components; equipment: multimeter, oscilloscope, logic probe);			X		X	X		X	X	

	B3.3 draw and interpret diagrams that represent circuit components and functions (e.g., schematic diagram, block diagram, flow chart);									X	X	
	B3.4 use computer programs to simulate circuit performance and to draw schematic diagrams and circuit layouts (e.g., circuit simulator, schematic capture software, printed circuit board layout software).			X		X					X	
Networking Concepts	B4.1 design, install, and configure a peer-to-peer network (e.g., choose appropriate computers and network interfaces, construct cables, enable file sharing) using appropriate tools, materials, and equipment (e.g., UTP cable, 8P8C connectors, crimping tool, cable tester);											
	B4.2 draw diagrams of various LAN types (e.g., peer-to-peer, client-server) and topologies (e.g., bus, star, ring);											
	B4.4 use a variety of methods to verify the operation of a network (e.g., visual inspection, ping, ipconfig, telnet, tracert, arp);			X		X				X	X	
	B4.5 use a problem-solving process (see pp. 21–23) to troubleshoot networks.			X		X				X	X	
Computer Programming	B5.1 use constants, variables, expressions, and assignment statements correctly, taking into account the order in which operations are performed;			X		X				X	X	
	B5.2 use input statements, output statements, selection structures, and repetition structures in a program;			X		X				X	X	
	B5.3 use a design process (see pp. 22–23) to write, test, and debug a computer program that controls and/or responds to the inputs from an external device (e.g., LED array, motor, relay, infrared sensor, temperature sensor).			X	X	X	X	X	X	X	X	X
<b>TEJ3M</b>	<b>C. Technology, The Environment and Society</b>	WS	DG	BR	MM	I1	PS	I4	SJ	I2	LC	
Technology and the Environment	C1.1 describe the effects of computer and electronic technology on the environment (e.g., accumulation of electronic waste, including lead and other toxic materials used in computers; release of ozonedestroying chemicals used to wash soldering flux from circuit boards; energy consumed by computers left in standby mode; fuel consumption and air pollution reduced by computerized traffic-control systems);								-			
	C1.2 outline how community partners and government agencies apply the reduce/reuse/ recycle concept to computer technology.								-			
	C2.1 describe the benefits of computer and electronic technology for society (e.g., greater efficiency and lower costs for information services, improved access to technology for economically disadvantaged people and nations, development of a “global village”);								-			



