

Sample Program Operating systems and hardware

Rationale: This theme provides the opportunity for students to develop the knowledge and skills required to configure, use and optimise computer operating systems, as well as correctly operate and manage the selection, maintenance and siting of computer hardware.

Units of competency: ICAS3234A Care for computer hardware
 ICAU2005A Operate computer hardware
 ICAU2231A Use computer operating system

HSC Requirements and Advice – Key terms and concepts:

Care for computer hardware	Use computer operating system
<ul style="list-style-type: none"> • business requirements • cleaning materials and techniques • computer hardware • correct manual handling • diagnostic testing • diagnostic tools and software • environmental conditions • hardware and software interoperability • hardware components and their function • hardware problems • legal requirements • maintenance and storage of hardware, peripherals and media • maintenance requirements • maintenance schedules • manufacturer requirements • media • move/relocate hardware • occupational health and safety (OHS) principles and responsibilities • OHS standards • peripherals • problem-solving • quality standards • reloading of software • removal and replacement of components • safe work practices • selection of hardware and peripherals • set-up procedures • siting requirements • software • span of quality levels • system protection devices • warranty, replacement and upgrade. 	<ul style="list-style-type: none"> • adding peripherals • apply user changes • basic structure of a personal computer • basic tasks • benefits and limitations of single-user, multi-user and network • command language/line • command structure and syntax • compatibility of operating systems • computer operating system • configure operating system • control panel software • create users • customise graphical user interface • directory structure • features of operating system utilities and third party utilities • folder hierarchy • functionality checks • generic and customised vendor drivers • graphical user interface (GUI) • guides and documentation • input and output device • install drivers • install, upgrade and uninstall application software • interoperability between operating systems • locate and install software • main external connectors • main features of a motherboard • operating system software • optimise operating system • path relationships • peripherals • purpose of an operating system • safe work practices • set passwords • use operating system • working environment.

Assessment:

Unit/Element of competency	Possible assessment strategy
<p><i>ICAU2005A Operate computer hardware</i></p> <p>1 Identify computer hardware components</p> <p>1.1 Identify external hardware components and peripherals</p> <p>1.2 Identify internal hardware components</p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.6 Draw a simple block (schematic) diagram showing the interconnection of the various components of a computer</p> <p>3 Use computer input equipment</p> <p>3.1 Follow OH&S standards and organisational policies and procedures when using computer input equipment</p> <p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system</p> <p>1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p> <p>2 Use operating system</p> <p>2.1 Install, upgrade and uninstall application software to suit the working environment</p> <p>2.2 Use both the graphical user interface and the command line interface to perform basic tasks</p> <p>3 Optimise operating system</p> <p>3.1 Use operating system and third party utilities</p> <p>3.2 Customise the graphical user interface</p> <p>4 Support input and output devices</p> <p>4.1 Set up input and output devices and check functionality</p> <p>4.2 Install drivers as appropriate and check functionality</p> <p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p>	<p>Task 1 <i>Workstation assessment report</i></p> <p>Students are required to produce a report outlining the hardware and software of a standard computer workstation using an appropriate software application.</p> <p>Students will undertake each of the following tasks and outline the procedures taken and/or their assessment in their report:</p> <ul style="list-style-type: none"> • OHS assessment • power down/up workstation • clean and maintain the workstation • identify the interconnection between the computer and its peripherals and document in a schematic diagram • access and modify the control panel • internal and external hardware report • software report • recommendations for hardware and software upgrades • future maintenance schedule/checklist.

Unit/Element of competency	Possible assessment strategy
<p>2 Establish location requirements for hardware and peripherals 2.1 Determine and apply suitable environmental conditions for hardware and peripherals</p> <p>3 Establish maintenance practices 3.1 Determine maintenance requirements specified by the equipment manufacturer 3.2 Produce maintenance schedules, including the removal of dust and grease build-up</p> <p>4 Determine appropriate hardware quality standards 4.1 Consider and apply business requirements in respect of hardware matters</p>	
<p><i>ICAU2005A Operate computer hardware</i></p> <p>1 Identify computer hardware components 1.1 Identify external hardware components and peripherals 1.2 Identify internal hardware components</p> <p>3 Use computer input equipment 3.1 Follow OH&S standards and organisational policies and procedures when using computer input equipment</p> <p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system 1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p> <p>2 Use operating system 2.1 Install, upgrade and uninstall application software to suit the working environment 2.2 Use both the graphical user interface and the command line interface to perform basic tasks</p> <p>3 Optimise operating system 3.2 Customise the graphical user interface</p> <p>4 Support input and output devices 4.1 Set up input and output devices and check functionality 4.2 Install drivers as appropriate and check functionality</p> <p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices 1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware 1.2 Determine, record and apply requirements specified by hardware</p>	<p>Task 2 <i>Operate computer hardware</i></p> <p>Students are required to follow the appropriate procedures to install and operate computer hardware (a printer) for a group of users.</p> <p>Students follow appropriate OHS procedures to complete the following tasks:</p> <ul style="list-style-type: none"> • select and arrange computers, printers and workstations • connect all hardware to a surge filter or UPS <ul style="list-style-type: none"> - check for working order - replace suspect components where necessary • use administrator privileges to create new user accounts • install, configure and test a printer using the latest available drivers from the manufacturer <ul style="list-style-type: none"> - test the application - troubleshoot where necessary • access the service log <ul style="list-style-type: none"> - identify last service job - update log • uninstall the printer and application • pack up and store all hardware and peripherals.

Unit/Element of competency	Possible assessment strategy
<p>manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p> <p>2 Establish location requirements for hardware and peripherals</p> <p>2.1 Determine and apply suitable environmental conditions for hardware and peripherals</p> <p>2.2 Determine and apply system protection devices</p> <p>2.3 Determine and apply requirements when moving hardware</p> <p>2.4 Determine and apply suitable storage principles for hardware and associated peripherals and media</p> <p>3 Establish maintenance practices</p> <p>3.3 Perform diagnostic functions, including replacing suspect components with other serviceable components and reloading of associated software</p> <p>3.5 Perform diagnostic functions using the operating system and third-party diagnostic tools</p>	
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.1 Describe the functions of computer hardware and associated OH&S standards and environmental considerations around hardware use and disposal</p> <p>2.2 Describe the function of a computer operating system</p> <p>2.3 Describe the boot process</p> <p>2.4 State the relationship between an application program, the operating system and hardware</p> <p>2.5 State the general differences between the different computer platforms and their respective operating systems</p>	<p>Task 3 <i>Research report</i></p> <p>Students undertake a research activity focusing on the interrelationship between computer hardware and software and produce a report using an appropriate software application.</p> <p>The research and report should address the following:</p> <ul style="list-style-type: none"> • the functions of computer hardware • OHS standards and environmental considerations around hardware use and disposal • function of a computer operating system • boot process • command line interface • relationship between an application program, the operating system and hardware • general differences between the different computer platforms and their respective operating systems.

Unit/Element of competency	Task 1	Task 2	Task 3
ICAU2005A Operate computer hardware			
<i>1 Identify computer hardware components</i>			
1.1 Identify external hardware components and peripherals	✓	✓	
1.2 Identify internal hardware components	✓	✓	
<i>2 Understand the inter-relationship between computer hardware and software</i>			
2.1 Describe the functions of computer hardware and associated OH&S standards and environmental considerations around hardware use and disposal			✓
2.2 Describe the function of a computer operating system			✓
2.3 Describe the boot process			✓
2.4 State the relationship between an application program, the operating system and hardware			✓
2.5 State the general differences between the different computer platforms and their respective operating systems			✓
2.6 Draw a simple block (schematic) diagram showing the interconnection of the various components of a computer	✓		
<i>3 Use computer input equipment</i>			
3.1 Follow OH&S standards and organisational policies and procedures when using computer input equipment	✓	✓	
ICAU2231A Use computing operating system			
<i>1 Configure operating system</i>			
1.1 Configure operating system to suit the working environment, including but not limited to setting variables	✓		
<i>2 Use operating system</i>			
2.1 Install, upgrade and uninstall application software to suit the working environment	✓	✓	
2.2 Use both the graphical user interface and the command line interface to perform basic tasks	✓	✓	
<i>3 Optimise operating system</i>			
3.1 Use operating system and third party utilities	✓		
3.2 Customise the graphical user interface	✓	✓	
3.3 Use techniques unique to the command line interface			✓
<i>4 Support input and output devices</i>			
4.1 Set up input and output devices and check functionality	✓	✓	
4.2 Install drivers as appropriate and check functionality	✓	✓	

Unit/Element of competency	Task 1	Task 2	Task 3
ICAS3234A Care for computer hardware			
<i>1 Establish safe work practices</i>			
1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware	✓	✓	
1.2 Determine, record and apply requirements specified by hardware manufacturers	✓	✓	
1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements	✓	✓	
<i>2 Establish location requirements for hardware and peripherals</i>			
2.1 Determine and apply suitable environmental conditions for hardware and peripherals	✓	✓	
2.2 Determine and apply system protection devices		✓	
2.3 Determine and apply requirements when moving hardware		✓	
2.4 Determine and apply suitable storage principles for hardware and associated peripherals and media		✓	
<i>3 Establish maintenance practices</i>			
3.1 Determine maintenance requirements specified by the equipment manufacturer	✓		
3.2 Produce maintenance schedules, including removal of dust and grease build up	✓		
3.3 Perform diagnostic functions, including replacing suspect components with other serviceable components and reloading of associated software		✓	
3.4 Determine whether unserviceable components are replaceable through warranty, replacement or upgrade		✓	
3.5 Perform diagnostic functions using the operating system and third party diagnostic tools		✓	
<i>4 Determine appropriate hardware quality standards</i>			
4.1 Consider and apply business requirements in respect of hardware matters	✓		
4.2 Determine and apply quality standards to the selection of appropriate hardware and associated peripherals	✓	✓	

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
<p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system 1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p>	<p>Back to basics</p> <p>Identification of:</p> <ul style="list-style-type: none"> • the basic structure of a personal computer (PC) <ul style="list-style-type: none"> - central processing unit (CPU) - random access memory (RAM) - peripherals <ul style="list-style-type: none"> ▪ input device ▪ output device - storage device(s) • the main features of the motherboard <ul style="list-style-type: none"> - CPU - chip set - crystal oscillator - RAM - read only memory (ROM) - system bus - expansion slots - cache memory • the main external connectors found at the back of the PC. 	<p>Review section on ‘Operate a Personal Computer’ from Program 1.</p> <p>Dismantle a surplus computer (more than one if available) and identify:</p> <ul style="list-style-type: none"> • major components as listed • external connectors <ul style="list-style-type: none"> - identify those which are associated with input, and those with output devices. <p>Create a labelled diagram of:</p> <ul style="list-style-type: none"> • the internal layout of the system • the external connectors to the system. <p>Examine a range of CPU architecture schematics from the internet or computing magazines, discuss the features of each.</p> <p>Research the difference between ROM, RAM and flash memory and create a fact sheet.</p>
<p><i>ICAU2005A Operate computer hardware</i></p> <p>1 Identify computer hardware components 1.1 Identify external hardware components and peripherals 1.2 Identify internal hardware components</p> <p>2 Understand the inter-relationship between computer hardware and software 2.1 Describe the functions of computer hardware and associated OH&S standards and environmental considerations around hardware use and disposal</p>	<p>Computer hardware</p> <p>Difference between internal hardware components, external hardware components and peripherals.</p>	<p>Define the following terms:</p> <ul style="list-style-type: none"> • internal hardware components • external hardware components • peripherals. <p>Identify the basic computer hardware required to perform data entry tasks.</p> <p>Using the diagrams created previously, identify the peripheral devices that may be associated with:</p>

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<p><i>ICAU2231A Use computer operating system</i></p> <p>4 Support input and output devices 4.1 Set up input and output devices and check functionality</p> <p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices 1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware 1.2 Determine, record and apply requirements specified by hardware manufacturers 1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p>	<p>An understanding of the difference between an input and output device.</p> <p>Function and working knowledge of:</p> <ul style="list-style-type: none"> • external hardware components <ul style="list-style-type: none"> - work station - computer - network - server • internal hardware components <ul style="list-style-type: none"> - motherboard - complimentary metal oxide semi-conductor (CMOS) battery - CPU - interface cards - drives - fax/modem cards - RAM • peripherals <ul style="list-style-type: none"> - input device <ul style="list-style-type: none"> ▪ keyboard ▪ mouse ▪ scanner - output device <ul style="list-style-type: none"> ▪ monitor ▪ printer - storage device <ul style="list-style-type: none"> ▪ including removable storage device - communication device <ul style="list-style-type: none"> ▪ modem. 	<ul style="list-style-type: none"> • external connectors (on the rear panel) • internal expansion slots. <p>Discuss the difference between the purpose of an input and output device.</p> <p>Brainstorm a range of common input and output devices.</p> <p>Identify the components of a network system in the school or workplace and discuss the different functions of each component.</p> <p>Construct a computer hardware fact sheet using a word processing application:</p> <ul style="list-style-type: none"> • create a table explaining the function of a range of computer components and utilities • classify and group the elements under the following headings: <ul style="list-style-type: none"> - processing - storage (internal and external) - output - input - communication - operating system and utility programs.

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<p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p>	<p>Hardware register</p> <p>Details recorded in a hardware register:</p> <ul style="list-style-type: none"> • nature of business • CMOS settings • type and amount of computer memory • CPU type and speed • peripherals installed and their settings • operating system and version • software installed and version. 	<p>Class discussion:</p> <ul style="list-style-type: none"> • why would it be useful to keep a detailed hardware register in the workplace? • what would it need to contain? <p>Link to task 1.</p> <p>Class demonstration (hands-on activity if access allows)</p> <ul style="list-style-type: none"> • enter BIOS on system start-up and examine the various configurable CMOS settings • access system information to identify CPU type, speed and memory configuration • use a third party utility program to obtain more detailed information about system performance and settings • examine accessible settings for peripheral devices via the system control panel • use Operating System help files to determine the type and version of the OS used • use the ‘About’ section of an application’s ‘HELP’ menu to determine the version of software installed • discuss the difference between a software update and a patch • discuss why workstations are often ‘locked down’ to limit access to many of the demonstrated features.
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.5 State the general differences between the different computer platforms and their respective operating systems</p> <p><i>ICAU2231A Use computer operating system</i></p>	<p>Computer platform</p> <p>General differences between computer platforms and their respective operating systems:</p> <ul style="list-style-type: none"> • Apple Macintosh • PCs. <p>An understanding of the following concepts:</p>	<p>Research activity – investigate the differences between Mac OS X and Windows XP</p> <ul style="list-style-type: none"> • identify five differences in user interface between the two • identify 5 operational similarities between the two. <p>Develop a glossary and define each of the terms listed.</p>

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<p>1 Configure operating system 1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p>	<ul style="list-style-type: none"> • configure • optimise • support • install • uninstall • upgrade • compatibility. 	<p>Discuss the similarities and differences between:</p> <ul style="list-style-type: none"> • configure and optimise • install and upgrade.
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software 2.2 Describe the function of a computer operating system 2.3 Describe the boot process</p> <p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system 1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p> <p>2 Use operating system 2.1 Install, upgrade and uninstall application software to suit the working environment 2.2 Use both graphical user interface and the command line interface to perform basic tasks</p> <p>3 Optimise operating system 3.1 Use operating system and third-party utilities 3.3 Use techniques unique to the command line interface</p>	<p>Computer operating system</p> <p>A definition of:</p> <ul style="list-style-type: none"> • operating system. <p>An understanding of the purpose (function) of an operating system:</p> <ul style="list-style-type: none"> • it is the first program loaded into the computer by a boot program and remains in memory at all times • it manages all other programs including the allocation and usage of hardware resources such as <ul style="list-style-type: none"> - memory - CPU time - access and security - hard disk space - peripheral device(s) • it is the foundation software on which other applications/ application programs depend. <p>Describe the boot process.</p>	<p>Internet search for a range of definitions for the term ‘operating system’. Compare definitions to arrive at a shared meaning for the term.</p> <p>Make several observations of the boot up dialogue during system start-up.</p> <p>Brainstorm as many of the observed functions/events as possible. Classify this list according to the following categories:</p> <ul style="list-style-type: none"> • boot-up processes • system management tasks • security tasks • peripheral management • utility functions • memory and storage. <p>Review the following website and make a summary of the key points about the boot-up process http://www.everythingcomputers.com/pc_startup_trouble.htm</p> <p>Create a flowchart of the boot-up process for a stand alone machine.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
		Discuss how this process may differ on a network.
	<p>A working knowledge of the benefits and limitations of the following operating systems:</p> <ul style="list-style-type: none"> • single-user/task • multi-user/task • network. <p>A knowledge of:</p> <ul style="list-style-type: none"> • compatibility of an operating system in respect to other versions • interoperability between operating systems (with respect to the ability of operating systems from different vendors to share data using agreed file formats and protocols). <p>An understanding of the different forms in which a user can interact with the operating system:</p> <ul style="list-style-type: none"> • command language/line • graphical user interface (GUI) • combination of both. 	<p>Create a table outlining the advantages and limitations of various categories of operating systems.</p> <p>Develop a time line showing the growth of:</p> <ul style="list-style-type: none"> • Microsoft operating systems from DOS through to Windows XP • Apple operating systems from DOS/ProDOS through to OS X. <p>Internet research – identify the differences between Windows XP Home Edition and Windows XP Professional Edition, in particular:</p> <ul style="list-style-type: none"> • security features • hard disk management • networking and file sharing. <p>Research activity – find examples of the following file formats and identify their application:</p> <ul style="list-style-type: none"> • file formats that are transferable between operating systems (eg JPEG, MPEG, TXT) • file formats that are unique to particular platforms. <p>Discuss command line instructions (machine oriented) and the development of GUI (User Oriented) interfaces.</p> <p><i>NOTE: Mac OS X users can use a command line type interface via TERMINAL in the UTILITIES folder. Local administrator password is required. Limited command line type instructions are also available through internet configuration (ping, traceroute etc)</i></p>

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	<p>A basic understanding of the difference in operation of a GUI and a command line interface.</p> <p>A basic knowledge of command structure and syntax including the use of switches and parameters.</p> <p>A basic knowledge of the features of operating system utilities and third-party utilities:</p> <ul style="list-style-type: none"> • what information is produced when they are run • how the information should be interpreted • appropriate actions resulting from the information. <p>A basic understanding of:</p> <ul style="list-style-type: none"> • directory structure • folder hierarchy • path relationships. <p>An awareness of the differences in:</p> <ul style="list-style-type: none"> • procedures for ‘logging in/out’ between operating systems • access to the operating system for different users <ul style="list-style-type: none"> - desktop user - manager - information technology (IT) support staff - system administrator - network administrator. 	<p>Teacher demonstration of the use of command line instructions on an unrestricted machine (eg. DIR, pathnames, change directory (cd.)):</p> <ul style="list-style-type: none"> • apply some of the basic switches and parameters to demonstrate control of the command line (eg DIR/p to page the directory, ping, config) • demonstrate the same functions using the windows explorer interface. <p>Run a virus scan or spyware scan of a computer system. Observe the information that is generated and the default actions recommended.</p> <p>Discuss the importance of organisation in any system of data storage.</p> <p>Identify the directory structure of accessible drives on a student workstation.</p> <p>Construct a hierarchy table to describe the folder structure of a given drive (eg Students Home directory)</p> <p>Identify the path to a particular file by following its path name.</p> <p>Sequencing exercise – provide students with a randomly organised list of the events involved in logging on and logging off a networked computer. Students are to:</p> <ul style="list-style-type: none"> • organise the list in the appropriate sequence for both logging on and off • compare solutions • discuss which events would be eliminated on a stand-alone computer.

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	<p>A knowledge of how to:</p> <ul style="list-style-type: none"> • create users for a multi-user system • apply user changes • set passwords for different users. 	<p>Design a table to show the differences in necessary system access for a range of users. For each type of user consider the following:</p> <ul style="list-style-type: none"> • ability to add, delete and change folders and files • access to local and networked hard drives • ability to reconfigure the desktop • adding and removing applications • ability to add users and change their security level • ability to access the work of others stored on the system. <p>Brainstorm the differences between stand-alone and multi-user systems</p> <p>Link to Task 2.</p>
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.4 State the relationship between an application program, the operating system and hardware</p> <p>2.6 Draw a simple block (schematic) diagram showing the interconnection of the various components of a computer</p> <p><i>ICAU2231A Use computer operating system</i></p> <p>2 Use operating system</p> <p>2.1 Install, upgrade and uninstall application software to suit the working environment</p> <p>4 Support input and output devices</p> <p>4.1 Set up input and output devices and check functionality</p> <p><i>ICAS3234A Care for computer hardware</i></p>	<p>Relationship between computer operating system, hardware and application software</p> <p>Interconnection of the various components of a computer.</p> <p>An awareness of the difference between operating system software and application software.</p> <p>Relationship between operating system, hardware and application software.</p>	<p>Class discussion.</p> <p>Link to Task 1.</p> <p>Discuss the purpose of ‘application software’.</p> <p>Using a familiar application as an example (eg word processing or spreadsheet application) identify:</p> <ul style="list-style-type: none"> • the differences between the application’s function and that of the operating system. • functions of the application that are: <ul style="list-style-type: none"> - independent of the OS (eg formatting, tables, formulae) - dependent on the OS (eg load, save) - hardware dependent (usually via the OS) (eg printing).

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<p>4 Determine appropriate hardware quality standards</p> <p>4.1 Consider and apply business requirements in respect of hardware matters</p> <p>4.2 Install drivers as appropriate and check functionality</p>	<p>Basic knowledge of hardware and software interoperability.</p> <p>A definition of:</p> <ul style="list-style-type: none"> • driver. <p>The difference between a generic driver and a customised vendor driver, and the implications of using one or the other.</p> <p>An awareness that drivers need to be updated periodically to ensure optimal performance.</p>	<p>Research activity – select an application program that is operable on more than one computing platform:</p> <ul style="list-style-type: none"> • identify the minimum system requirements for each platform • list the requirements that are similar between platforms (eg memory and peripherals), and those that are platform-specific (eg processor, speed) • find any information on common file formats which will allow data interchange between platforms. <p>Discuss the advantages of hardware and software that is operable on more than one platform.</p> <p>Internet search for the meaning and application of the term ‘driver’. Compare findings to arrive at a shared definition.</p> <p>Explain difference between generic drivers and custom vender drivers.</p> <p>Discuss the advantages and disadvantages of using each type of driver.</p> <p>Discuss reasons why drivers would need periodic updating and the potential consequences of not updating them.</p>
<p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system</p> <p>1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p> <p>2 Use operating system</p> <p>2.1 Install, upgrade and uninstall application software to suit the working environment</p>	<p>Selection of computer hardware and software for a company/organisation</p> <p>An awareness of the operating system supported by the company/organisation.</p>	<p>Make a list of the different hardware platforms supported by the school/workplace and identify the operating system used on each.</p> <p>Guest speaker – school/organisation technical support officer to discuss the training requirements for supporting the operating systems used.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
<p><i>ICAS3234A Care for computer hardware</i></p> <p>4 Determine appropriate hardware quality standards</p> <p>4.1 Consider and apply business requirements in respect of hardware matters</p> <p>4.2 Determine and apply quality standards to the selection of appropriate hardware and associated peripherals</p>	<p>Span of quality levels in common hardware.</p> <p>A knowledge of application software appropriate to the operating system.</p> <p>Selection of appropriate hardware and software taking into consideration business requirements:</p> <ul style="list-style-type: none"> • nature of business • user requirement(s) • size of the company/organisation • cost • quality • robustness • industry standard components • capability for further system upgrade. 	<p>Activity – review a number of current Australian computing magazines and collect reviews on desktop computers in the \$900-\$1500 price range</p> <ul style="list-style-type: none"> • create a table showing the standard features (processor, memory speed and type, VDU, storage, supported interfaces) of a range of the hardware • compare the overall reviews of the hardware • make and justify a recommendation as to which unit is best quality and which may be best value for money. <p>Link to Task 1.</p> <p>Discuss the features of hardware and software that would be appropriate for:</p> <ul style="list-style-type: none"> • an individual, home user • a small business (one person, limited budget) • a small business (up to 10 people and 1 or 2 offices/sites, limited budget) • a medium business (20-30 employees, multiple sites, moderate budget) • large business (many employees and sites, large budget). <p>Link to Task 1.</p>
<p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work</p>	<p>OHS and safe work practices</p> <p>Knowledge of general occupational health and safety (OHS) principles and responsibilities.</p> <p>An awareness of safe work practices:</p> <ul style="list-style-type: none"> • OHS induction training (general, work activity and location-specific) • selection of appropriate tools for the task • correct use, maintenance and storage of tools 	<p>Content covered in Program 1 – Safety in the workplace.</p> <p>Revise and contextualise to the installation and maintenance of computer hardware.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
practices, taking into account legal and manufacturer requirements	<ul style="list-style-type: none"> • correct handling, application, transport and storage of materials • safe posture (sitting, standing, bending and lifting) • correct manual handling (lifting and transferring) • correct use of fire fighting equipment <ul style="list-style-type: none"> - fire blanket - fire extinguishers • hazard identification and risk control • access to first aid kits • procedures to follow in the event of an emergency • effective communication and teamwork • adherence to work instructions, organisation/company policy and standard operating procedures • housekeeping/clean-up procedures with due consideration to OHS and the environment. 	
<p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p>	<p>OHS principles</p> <p>OHS principles specific to:</p> <ul style="list-style-type: none"> • equipment powered by mains • high impedance devices <ul style="list-style-type: none"> - cathode-ray tube (CRT) monitor - system unit power supply - backup power supply • hazardous materials. 	<p>Research the hazards associated with mains-powered equipment, radiation and hazardous material.</p> <p>Identify electrical and radiation hazards and hazardous materials in the classroom/workplace.</p> <p>Develop a list of OHS principles to apply to these hazards.</p> <p>Design a series of small safety posters to place near the identified equipment.</p>
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.1 Describe the functions of computer hardware and associated OH&S standards and</p>	<p>OHS standards for hardware</p> <p>OHS standards for installation, use and maintenance of computer hardware:</p> <ul style="list-style-type: none"> • posture • lighting 	<p>Revise and contextualise content covered in Program 1 – Safety in the workplace to the installation and maintenance of computer hardware.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
<p>environmental considerations around hardware use and disposal</p> <p>3 Use computer input equipment</p> <p>3.1 Follow OH&S standards and organisational policies and procedures when using computer input equipment</p> <p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p>	<ul style="list-style-type: none"> • ergonomic workstation • prevention of occupational overuse syndrome (OOS) • ventilation • manual handling • electrical safety • monitor time and exposure. 	<p>Class discussion:</p> <ul style="list-style-type: none"> • ergonomic principles to avoid back, wrist and eye strain. • procedures and exercises for avoiding strain and injury • work practices.
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.1 Describe the functions of computer hardware and associated OH&S standards and environmental considerations around hardware use and disposal</p> <p>3 Use computer input equipment</p> <p>3.1 Follow OH&S standards and organisational policies and procedures when using computer input equipment</p> <p><i>ICAU2231A Use computer operating system</i></p> <p>4 Support input and output devices</p>	<p>Locating and installing hardware and peripherals</p> <p>Potential environmental effects of common types of hardware.</p> <p>Appropriate environmental conditions for hardware, including consideration of the following factors:</p> <ul style="list-style-type: none"> • dust • temperature • air circulation • moisture. <p>Correct manual handling techniques when:</p> <ul style="list-style-type: none"> • moving 	<p>Discuss redundancy and disposal of obsolete equipment.</p> <p>Link to Task 3.</p> <p>Identify problems related to the work environment that effect hardware.</p> <p>Examine dust filter on system fan and make observations about the local environment.</p> <p>Discuss the effect environmental conditions can have on hardware.</p> <p>Review safe handling practices from Program 1 – Safety in the workplace.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
<p>4.1 Set up input and output devices and check functionality</p> <p><i>ICAS3234A Care for computer hardware</i></p> <p>1 Establish safe work practices</p> <p>1.1 Determine, record and apply relevant legal requirements and OH&S standards to the installation and maintenance of computer hardware</p> <p>1.2 Determine, record and apply requirements specified by hardware manufacturers</p> <p>1.3 Determine, record and apply safe work practices, taking into account legal and manufacturer requirements</p> <p>2 Establish location requirements for hardware and peripherals</p> <p>2.1 Determine and apply suitable environmental conditions for hardware and peripherals</p> <p>2.3 Determine and apply requirements when moving hardware</p>	<ul style="list-style-type: none"> • lifting/carrying • loading/unloading • working at heights • bending and twisting • using mechanical aids. <p>An awareness of legal requirements for weight limits.</p> <p>Procedures for securing hardware and peripherals prior to move/relocation.</p> <p>Legal requirements:</p> <ul style="list-style-type: none"> • licensing • placement of cabling and installation of fixed cabling • electrical installation • electronic performance • testing and tagging of electrical equipment on a regular basis. <p>An awareness of safe work practices:</p> <ul style="list-style-type: none"> • for attaching and/or removing devices and cables • when working with electricity. 	<p>Identify devices that might need to be lifted or moved around during maintenance. For each one:</p> <ul style="list-style-type: none"> • record their weight • identifying appropriate manual handling techniques. <p>Examine a range of packaging to identify:</p> <ul style="list-style-type: none"> • key features to protect the items • safe handling, storage and stacking instructions. <p>Discuss problems associated with objects being stored too high or low and identify appropriate safe handling practices.</p> <p>Brainstorm the hazards associated with electrical cabling and strategies to avoid/reduce the risk.</p> <p>Develop a set of guidelines for the use and placement of cabling in the school.</p> <p>Visit the WorkCover website and review the information on electrical safety requirements. Identify those relevant to the IT industry www.workcover.nsw.gov.au/safebusiness/Business_Assistance_Unit/FAQs/Electrical.aspx .</p> <p>Discuss safe working practices involving powered and switched devices.</p> <p>Locate safety cut off switches and earth leakage safety switches in the classroom/workplace and discuss their use.</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
	<p>Interpretation of manufacturer’s user manuals and help functions.</p> <p>Siting requirements, set-up procedures and functionality checks for a range of system hardware and peripheral devices.</p> <p>Adding peripherals:</p> <ul style="list-style-type: none"> • following manufacturer’s instructions • connecting to <ul style="list-style-type: none"> - an external port <ul style="list-style-type: none"> ▪ serial ▪ parallel ▪ game ▪ universal serial bus (USB) - an expansion card <ul style="list-style-type: none"> ▪ expansion slot in motherboard. <p>A knowledge of how to:</p> <ul style="list-style-type: none"> • locate and install software • run the software to check functionality • troubleshoot as required. <p>Organisational policies and procedures when using computer input equipment.</p>	<p>Identify the location in which manufacturers user manuals are stored.</p> <p>Locate the manual for a particular device and identify the installation and setup requirements.</p> <p>Write a simple procedure for installing a piece of hardware that could be used by a trainee.</p> <p>Demonstrate appropriate connections.</p> <p>Link to Task 1.</p> <p>Link to Task 2.</p> <p>Identify the location of driver software for a piece of hardware using a range of different methods:</p> <ul style="list-style-type: none"> • with original documentation of packaging • from company website • from a third party website. <p>Demonstrate installation techniques, emphasising safe work practice.</p> <p>Review sample policies and procedures for using computer input equipment. Discuss why there is a need for this type of policy.</p>

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<p><i>ICAU2231A Use computer operating system</i></p> <p>1 Configure operating system 1.1 Configure operating system to suit the working environment, including but not limited to setting variables</p> <p>2 Use operating system 2.2 Use both graphical user interface and the command line interface to perform basic tasks</p> <p>3 Optimise operating system 3.1 Use operating system and third-party utilities 3.2 Customise the graphical user interface 3.3 Use techniques unique to the command line interface</p>	<p>Interacting with the computer operating system</p> <p>Use both GUI and command line interface to:</p> <ul style="list-style-type: none"> • log in • log out • get online help • change passwords • retrieve and edit previous commands. <p>A basic knowledge of the features of operating system utilities and third-party utilities including:</p> <ul style="list-style-type: none"> • what information is produced when they are run • how the information should be interpreted • appropriate actions resulting from the information. <p>Configure, use and optimise the operating system to suit the working environment using available document(s) to assist:</p> <ul style="list-style-type: none"> • software configuration guide • documents detailing operating system control panel and configuration data. <p>Optimise the operating system:</p> <ul style="list-style-type: none"> • use operating system and third party utilities • use control panel software tools to customise the GUI • use techniques unique to the command line interface. 	<p>Teacher demonstration and practical activities.</p> <p>Demonstrate use of PING command to check connection to a known computer address on the network, ping 127,0,0,1 and ping any other number.</p> <p>Discuss the data returned and its meaning.</p> <p>Demonstrate configuration of the work environment including:</p> <ul style="list-style-type: none"> • setting default location for saved files • default printer • mouse pointer • icons • shortcuts • mapped resources • desktop and screensaver.
<p><i>ICAU2231A Use computer operating system</i></p> <p>2 Use operating system 2.1 Install, upgrade and uninstall application software to suit the working environment</p>	<p>Application software</p> <p>Install, upgrade and uninstall application software to suit the working environment:</p> <ul style="list-style-type: none"> • word processing • database • spreadsheet • system browser 	<p>Teacher demonstration – installation of application software.</p> <p>Link to Task 2</p>

Unit / Element of competency / Performance criteria	Content	Possible learning experiences / activities
	<ul style="list-style-type: none"> • email • internet browser. 	
<p><i>ICAS3234A Care for computer hardware</i></p> <p>2 Establish location requirements for hardware and peripherals 2.2 Determine and apply system protection devices</p>	<p>System protection</p> <p>An awareness of the consequences of:</p> <ul style="list-style-type: none"> • power surges and ‘brownouts’ • interrupted power • viruses and destructive software • unauthorised access to computer system. <p>System protection devices:</p> <ul style="list-style-type: none"> • surge protection • uninterruptible power supply (UPS) devices • anti-virus protection • user authorisation procedures. 	<p>Brainstorm possible situations that could occur and cause damage to computers in various environments. Categorise into the following areas:</p> <ul style="list-style-type: none"> • environmental issues • software problems • vandalism <p>Discuss the potential implications for business and productivity.</p> <p>Identify a range of system protection methods:</p> <ul style="list-style-type: none"> • electrical protection • access protection • software protection. <p>Visit a computer supplier’s website and create a table outlining the specifications and prices for a range of electronic protection devices.</p>
<p><i>ICAS3234A Care for computer hardware</i></p> <p>2 Establish location requirements for hardware and peripherals 2.4 Determine and apply suitable storage principles for hardware and associated peripherals and media</p>	<p>Storing hardware, peripherals and media</p> <p>An awareness of possible consequences of inappropriate storage of hardware, peripherals and media.</p> <p>Points to consider when storing hardware, peripherals and media:</p> <ul style="list-style-type: none"> • climatic effects 	<p>Brainstorm the possible negative effects of poor storage of hardware, peripherals and media on:</p> <ul style="list-style-type: none"> • the equipment itself • productivity • the business. <p>Examine the care and storage instructions on a range of media and consumables and list key considerations.</p>

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	<ul style="list-style-type: none"> • OHS considerations • stability • security • ease of access. 	<p>Develop a table outlining the ideal storage conditions for a range of hardware, peripherals and media.</p>
<p><i>ICAS3234A Care for computer hardware</i></p> <p>3 Establish maintenance practices</p> <p>3.1 Determine maintenance requirements specified by the equipment manufacturer</p> <p>3.2 Produce maintenance schedules, including removal of dust and grease build-up</p> <p>3.3 Perform diagnostic functions, including replacing suspect components with other serviceable components and reloading of associated software</p> <p>3.5 Perform diagnostic functions using the operating system and third-party diagnostic tools</p>	<p>Maintenance of hardware and peripherals</p> <p>The importance of regular maintenance.</p> <p>Safe work practices specific to maintenance of computer hardware.</p> <p>An awareness of suggested maintenance schedules in user documentation or warranty conditions supplied by the manufacturer.</p> <p>Maintenance requirements:</p> <ul style="list-style-type: none"> • tasks <ul style="list-style-type: none"> - cleaning (inside and outside) - testing and functionality - diagnostic testing - replace/repair components - reloading/upgrading software - periodic physical checks for damaged cables - replacement of consumables • frequency • appropriate tools and techniques. <p>Establishment of maintenance schedules and practices for equipment.</p> <p>An awareness of details recorded in a maintenance report/ card:</p> <ul style="list-style-type: none"> • job reference number 	<p>Brainstorm a range of problems that can occur if users fail to maintain hardware and peripherals.</p> <p>Revise from Program 1 – Safety in the workplace.</p> <p>Review the owners manual and create a maintenance schedule for a network laser printer.</p> <p>Link to Task 1.</p> <p>Undertake a ‘health check’ for a standard workstation. Develop a report outlining maintenance to be undertaken. Complete any necessary maintenance requirements.</p> <p>Link to Tasks 1 and 2.</p> <p>Link to Task 1.</p> <p>Brainstorm the information that should be included on a maintenance record.</p>

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	<ul style="list-style-type: none"> • brief description of the problem • name of technician completing maintenance • date maintenance performed • time taken to complete the task • description of action to rectify the problem • description of follow-up action required • other comments. 	<p>Design a maintenance record card to be stored with a piece of hardware.</p>
<p><i>ICAS3234A Care for computer hardware</i></p> <p>3 Establish maintenance practices</p> <p>3.3 Perform diagnostic functions, including replacing suspect components with other serviceable components and reloading of associated software</p> <p>3.5 Perform diagnostic functions using the operating system and third-party diagnostic tools</p>	<p>Trouble shooting and testing of hardware and peripherals</p> <p>Signs of incorrect function of hardware components.</p> <p>Working knowledge of diagnostic testing to determine cause of hardware problems.</p> <p>General features, selection and use of diagnostic tools and software appropriate to the task:</p> <ul style="list-style-type: none"> • tools/software supplied with the operating system • third party diagnostic software/tool • diagnostic card. <p>Problem-solving process to identify root cause of the problem:</p> <ul style="list-style-type: none"> • identify possible cause of the problem • remove hardware/software that may mask/confuse the issue • test theory by <ul style="list-style-type: none"> - replacing offending item - using diagnostic tool. 	<p>Brainstorm a list of indicators of incorrect function.</p> <p>Link to Task 2.</p> <p>Internet search for diagnostic tests designed to help in a range of situations (eg network speed tests, hard disk diagnostics, task manager).</p> <p>Practical activity – undertake diagnostic testing for a range of faults.</p> <p>Link to Task 2.</p> <p>Discuss various approaches to problem-solving:</p> <ul style="list-style-type: none"> • top down (decision tree) • bottom up (process of elimination) • progressive elimination of possible causes • substitution of suspect parts with serviceable items and re-testing.

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<p><i>ICAS3234A Care for computer hardware</i></p> <p>3 Establish maintenance practices 3.2 Produce maintenance schedules, including removal of dust and grease build-up</p>	<p>Cleaning hardware and peripherals</p> <p>Materials required for cleaning:</p> <ul style="list-style-type: none"> • lint-free cloth • glass-cleaning spray • small brush • can of compressed air • vacuum cleaner • antistatic wristband • damp cloth and mild detergent • specialised cleaning kit. <p>Techniques for cleaning:</p> <ul style="list-style-type: none"> • the monitor • a keyboard • a mouse • the system unit • printers <ul style="list-style-type: none"> - laser - inkjet • drives. 	<p>Compile a list of equipment that could be used to make a cleaning toolkit, identifying the appropriate use of each material.</p> <p>Identify materials and equipment not suitable for cleaning hardware and peripherals.</p> <p>Undertake routine cleaning/maintenance on a workstation/peripheral.</p> <p>Demonstrate appropriate cleaning methods for a range of computer hardware.</p>
<p><i>ICAS3234A Care for computer hardware</i></p> <p>3 Establish maintenance practices 3.3 Perform diagnostic functions, including replacing suspect components with other serviceable components and reloading of associated software 3.4 Determine whether unserviceable components are replaceable through warranty, replacement or upgrade</p>	<p>Replacement of hardware components</p> <p>An awareness of:</p> <ul style="list-style-type: none"> • warranty conditions • available component upgrades • source of replacement/upgrade. 	<p>Examine manufacturer’s documentation for a range of hardware/peripherals to identify the warranty conditions.</p> <p>Discuss the role of consumer protection laws in relation to warranties.</p> <p>Visit the manufacturer’s website for the school computers to determine if upgrades are available.</p> <p>Research a number of computer component resellers websites. Undertake a costing for basic upgrade of the following components:</p>

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	<p>Company/organisation hardware replacement policy:</p> <ul style="list-style-type: none"> • identifying supplier(s) • obtaining quote(s) • gaining purchase authority. <p>Removal and replacement of hardware components.</p>	<ul style="list-style-type: none"> • 1GB Memory • dual layer DVD writer • hard disk drive of at least 200GB. <p>Guest speaker from an organisation’s IT support personnel to talk to students about:</p> <ul style="list-style-type: none"> • cyclic replacement policies • approved suppliers • quotations • ordering procedures. <p>Teacher demonstration.</p> <p>Students perform basic removal and addition of hardware components on surplus computers (if available).</p> <p>Discuss best practice safety procedures:</p> <ul style="list-style-type: none"> • appropriate preparation (disconnecting equipment) • use of static wrist strap • care and placement of equipment • adequate lighting.
<p><i>ICAU2005A Operate computer hardware</i></p> <p>2 Understand the inter-relationship between computer hardware and software</p> <p>2.1 Describe the functions of computer hardware and associated OH&S standards and environmental considerations around hardware use and disposal</p>	<p>Disposal of hardware and peripheral components</p> <p>Environmental considerations for the disposal of:</p> <ul style="list-style-type: none"> • redundant hardware and peripherals • packaging. 	<p>Discuss the environmental hazards associated with the disposal of redundant hardware and peripherals.</p> <p>Classify computer packaging into recyclable and non-recyclable product.</p> <p>Research local council or EPA guidelines/ recommendations on the disposal of surplus computing equipment.</p> <p>Students visit the following websites and make a summary of the key points about environmental disposal of IT</p>

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		<p>equipment.</p> <ul style="list-style-type: none"> • www.deh.gov.au/settlements/publications/waste/electrics/computer-report/regulations.html • www.agimo.gov.au/government/enviro_friendly_ict/responses/hp • www.computertakeback.com/ <p>Discuss the responsibilities of manufacturers and end users with regard to the environmental effects of the disposal of ITC equipment and consumables.</p> <p>Design a poster outlining the life cycle of computer hardware (life cycle analysis).</p> <p>Design a pamphlet promoting recycling of old hardware.</p>