

**Use Computer Operating
Systems and Hardware
(Windows 7)**
ICAICT201A

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**Computer Training Manual
for ICA11 Information and
Communications
Technology**
ICAICT201A

SAMPLE



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Introduction

ICAICT201A

Use Computer Operating Systems and Hardware

Audience

This manual is aimed at people who are studying the Certificate I in Information, Digital Media and Technology ICA10111. It covers the core unit of ICAICT201A Use Computer Operating Systems and Hardware (Windows 7). This manual is a learning resource and is not an assessment tool. An Assessment Tool & Marking Guide is available for this manual separately.

What this manual covers

This manual is designed for new and existing workers of an IT environment. This manual is for users requiring an Introduction to working IT organisations, IT professional bodies, industry publications and government departments involved in the IT industry.

All instructions and illustrations within this manual were written using Windows Vista operating system. Refer to the manufacturer's instructions if a different operating system is to be utilised.

At the end of this course you should have learned to:

- Identify and select computer systems to meet workplace requirements
- Install computer operating systems
- Configure operating system
- Use operating system
- Optimise operating system

For full scope of topics covered refer to **Elements of Competency** on the next page.

Access will be required to the following resources:

- Workstation
- Operating system
- Software configuration guides
- Documents detailing operating system control panel and configuration data

Prerequisites & Corequisites

- Basic keyboarding and mouse skills
- Basic computer knowledge

Course Length

In a training environment this manual is suitable for approximately 4 hours.

Manual Structure

This manual is aligned to the elements of competency and the relevant criteria for the ICAICT201A unit of the ICA11 training Package.

The layout of this manual is designed to give users an easy step-by-step guide through the required information and to allow users to navigate easily through the publication.

Our manuals are written clearly with pictures and step-by-step instructions, and can be used for instructor-led training as well as distance or self-paced learning.

This course contains instructor lead exercises as well as examples completed at the students' own pace.

Please note that the screen dumps outlined in this manual may vary dependant on your computer's system settings and formats.

What you need prior to commencement

This publication does not require course files. If you wish to order this manual simply visit our website at www.datadiscovery.com.au. The Product Code for this manual is DDICT201

Elements of Competency

This training manual will help in meeting the following elements of competency and performance criteria:

National Code	Element Name
ICAICT201A/01	Identify operating system and hardware components <ol style="list-style-type: none">1.1 Determine ICT <i>organisational requirements</i> and specifications1.2 Identify and select operating system1.3 Identify appropriate <i>external hardware components</i>1.4 Identify <i>internal hardware components</i>
ICAICT201A/02	Install and configure operating system and application software with hardware components <ol style="list-style-type: none">2.1 Install and configure operating system to meet organisational requirements2.2 Identify the functions associated with the operating system and associated boot process2.3 Configure power-management settings to minimise power consumption as an environmentally sustainable measure2.4 Use both the graphical user interface and the command line interface to perform basic tasks2.5 Install or upgrade application software onto the operating system and hardware configuration2.6 Determine the relationship between an application program, the operating system and hardware2.7 Identify general differences between the different computer platforms and their respective operating systems
ICAICT201A/03	Optimise operating system and hardware components <ol style="list-style-type: none">3.1 Optimise operating system using included tools or <i>third-party utilities</i>3.2 Customise the graphical user interface3.3 Use techniques unique to the command line interface3.4 Set up and configure external hardware components and check functionality3.5 Install drivers as appropriate and check functionality

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

Communication skills to:

- communicate with peers and supervisors
- seek assistance and expert advice

Literacy skills to:

- interpret user manuals and help functions
- read and write basic workplace documents

Problem-solving skills to address common operational problems when using computer Operating systems and operating computer hardware

Technical skills to:

- apply user changes for a multi-user operating system
- configure, use and optimise operating system
- create users for a multi-user system
- install and support peripheral devices
- operate a personal computer (PC)
- set passwords for different users
- use PC peripheral hardware

Required knowledge

Basic knowledge of current industry-accepted operating system, hardware and software products.

Compatibility of an operating system, in respect to other versions.

Function of single-user and multi-user operating systems.

Interoperability between operating systems.

OHS principles and responsibilities, including ergonomic principles to avoid injury associated with using computer systems.

Employability Skills Summary

The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary for the qualification in which this unit of competency is packaged, is as follows:

Employability Skill	Industry requirements for this qualification include:
Communication	<ul style="list-style-type: none"> providing client support using verbal and non-verbal communication reading and writing basic workplace documents and technical manuals
Teamwork	<ul style="list-style-type: none"> reporting identified software faults to appropriate persons accepting directions and following instructions from supervisor or team leader
Problem solving	<ul style="list-style-type: none"> configuring operating systems to suit the work environment solving organisational problems by applying technology
Initiative and enterprise	<ul style="list-style-type: none"> seeking feedback from users of new or upgraded technology selecting appropriate software and file formats for an activity
Planning and organising	<ul style="list-style-type: none"> identifying work to be completed and then prioritising tasks planning and organising the selection, manufacture and location of hardware
Self-management	<ul style="list-style-type: none"> establishing own work schedule and taking responsibility for own outputs in work and learning following occupational health and safety standards and organisational policies to avoid injury or illness observing environmentally sustainable work practices
Learning	<ul style="list-style-type: none"> acquiring and using new or upgraded technology skills to enhance own learning keeping up-to-date with current industry-accepted hardware and software products
Technology	<ul style="list-style-type: none"> selecting, installing and using computer software and hardware products

This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

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Workplace Requirements

Computer hardware and systems have become an integral part of many companies as they perform their daily operations. Almost every task that is undertaken relies on the outcome of computer programs to the point that the analysis, sourcing and installation of computer hardware and software has become a constant process for many workplaces. Some of these tasks include (but are certainly not limited to):

- Data processing.
- Manufacturing.
- Sales.
- Accounts and Finance.
- Work Processing.
- Spreadsheets.
- Web design and desktop publishing.
- Staff rostering and management.

As a member of the workplace IT department, it may be your responsibility to source, install and configure new equipment that will be required to meet the above mentioned tasks. New equipment may be needed for a number of reasons including:

- Failure of aged equipment.
- Increased specification requirements of new software.
- New users.
- Changes to business processes.
- Changes to industry practice.
- Manufacturing changes.
- Legislation changes.
- Availability of enhanced technologies.
- OH&S legislations and requirements.

Great care has to be taken to ensure that any new equipment or software purchased is not only compatible with the current workplace network, but can be fully and easily utilised by the workplace.

Determining System Requirements

When a need for new computer equipment has been identified within a workplace, there are a number of checks that should be undertaken. Not only are system changes costly to implement, but they can expose the workplace to great risk if the newly installed system fails to meet its intended needs.

For this reason, one of the most important processes in acquisition of a new computer system is the identification and management of system change requirements. This process will normally be undertaken in the following stages:

Needs identification and analysis

Quite obviously, the instigation of a process to source and install new computer equipment will be the direct result of an identified need (as per the examples listed on page 1). Once these needs have been identified, each task should be broken to ensure that every part has been accounted for. For example, if a new sales process is to be implemented that will require customer database software, a task breakdown should also determine whether the system will be required to create invoices or sale brochures as well. Should this need be missed, crucial software or equipment (printers etc.) may not be accounted for.

Equipment Audit

New computer equipment and software can be expensive. An equipment audit is used to check what the company currently holds and if it would be capable of meeting the identified needs. During this audit process, each piece of computer hardware and software needs to be checked and the following documented:

- Hardware specifications.
- Software currently loaded.
- Software capabilities (specifications).
- Software licenses held.
- Network compatibility.

We will cover each of these steps in more detail throughout this manual.

Software Needs

Once we have identified the needs of the workplace and have an understanding of what computer equipment we currently have, we then need to start identifying the software programs that are required to allow us to complete our tasks. When we deal with software, we need to account for two specific types:

Operating Systems The operating system is the platform software that interfaces all hardware to the software applications that are run on a computer.

Software applications Software applications perform the actual functions that we need to complete our tasks (word processing etc.). These are loaded onto the operating system which allows it to interface with other programs and hardware peripherals such as printers.

Regardless of whether we are dealing with the computer operating system or application program, we need to check the following:

1. Whether it can perform the tasks that we require.
2. The hardware specifications required to run the software.
3. Compatibility to current company network structure.
4. Amount of post installation configuration required.
5. Licensing requirements and costs.
6. Security requirements of the workplace.

Software Capabilities

In most cases, our first check will be to locate the application software that we require to meet our identified needs. We need to ensure that the software has the capabilities to meet our required tasks. Information on the relevant software programs can be located in a number of places including:

- Vendor's websites.
- Manufacturer's manuals and websites.
- Company procedures manuals.
- Industry publications and websites.
- IT Websites and blog sites.
- Software training manuals.
- Troubleshooting guides.

Many manufacturer and vendor websites contain links that allow for questions and issues to be directed to their own support areas. Many also contain information sharing areas where ideas and resolution requests can be discussed.

Technical Specification

Technical specifications and data are particularly useful during the analysis process as they not only give information in regards to installation and hardware requirements, but can also outline the capabilities and limitations of the software. Technical specifications are usually found on the websites of the software manufacturer but can also be found in the areas listed on the previous page in regards to software functionality information.

The following table gives an example of installation requirements for Microsoft Windows 7 and Microsoft Office 2010.

Microsoft Windows 7

- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor.
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit).
- 16 GB available hard disk space (32-bit) or 20 GB (64-bit).
- DirectX 9 graphics device with WDDM 1.0 or higher driver
- Internet access.
- Depending on resolution, video playback may require additional memory and advanced graphics hardware.
- Some games and programs might require a graphics card compatible with DirectX 10 or higher for optimal performance.
- For some Windows Media Centre functionality a TV tuner and additional hardware may be required.

Microsoft Office Standard 2010

- Processor: 500 megahertz (MHz) processor or higher.
- Memory (RAM): 256 megabyte (MB) RAM or higher.
- Hard Disk Space: 1.5 GB; a portion of the disk space will be freed after installation if the original download package is removed from the hard drive.
- Display: 1024x768 or higher resolution monitor.
- Operating System: Windows XP with Service Pack (SP) 3 (32-bit operating system (OS) only) or Windows Vista with SP1, Windows 7, Windows Server 2003 R2 with MSXML 6.0, Windows Server 2008, or later 32- or 64-bit OS.
- Other: You don't need to replace hardware that is capable of running Office 2007; it will support Office 2010.
- Additional. Requirements and product functionality can vary based on the system configuration and operating system.
- Graphics processor (GPU video adapter) – Use of graphics hardware acceleration requires DirectX 9.0c compatible graphics card with 64 MB or higher video memory (optional to help speed up some graphics features and charts rendering tasks in Office 2010, and to help using advanced transitions, animations, and video features new to PowerPoint 2010).

Source: www.microsoft.com

Operating Systems

The computer operating system is the platform software that interfaces each piece of hardware to the software applications you want to run. All individual pieces of software that you use (Microsoft Word, MYOB etc.) cannot run unless they are able to sit and run as part of the operating system.

The operating system can perform the following functions:

- Perform common hardware functions.
- Provide a user interface (often known as the 'desktop').
- Provide hardware independence.
- Manage system memory.
- Manage processing.
- Control access to system resources.
- Manage files.
- Accept keyboard input.
- Store data on disks.
- Send data to output devices.
- Command-based interfaces.

We have already discussed the fact that our chosen software must be not only able to meet our workplace requirements but be compatible with the operating system that we choose. This is due to the fact that in many cases, operating systems do not work and play well with others. If the computer equipment we are purchasing is to be added to a current network, we may not necessarily have a choice in the type of operating system that we wish to load.

Operating System Types

There are a number of common operating systems available to IT operators. All have varying functionality, restrictions and limitations such as file sharing and client capacities. Some common operating systems can include:

Windows XP

An upgrade from Windows 2000, Windows XP integrates all of the security and networking capabilities of Windows 2000 with some more user friendly functionality added. Aspects that were popular in Windows 98 such as '*plug and play*' were improved and included.

Internet based securities such as firewalls etc. were also added to keep up to date with the increased web capabilities and connections of many networks. Microsoft support for Windows XP expires in April 2014.

Windows Vista

Windows Vista replaces all earlier versions of Windows and like Windows XP etc., is the control centre of the PC. Windows Vista incorporates current processes such as internet securities, '*plug and play*' and multimedia programs as well as new functionalities.

Vista includes Windows Aero, which is the premium visual experience of Windows. It features a translucent glass design with subtle window animations and new window colours. Part of the Windows Aero experience is Windows Flip 3D, which allows the user to preview open windows in three-dimensional stacks, as well as taskbar buttons with live, thumbnail-sized window previews.

Windows 7

Windows 7 replaces all earlier versions of Windows and is an incremental upgrade to Vista, with fewer changes than the leap from XP to Vista. It has addressed many of the criticisms of Windows Vista.

New features include advances in touch screen capabilities and handwriting recognition, support for virtual hard disks, improved performance on multi-core processors, and improved speed and security.

Visually, the Taskbar, desktop and Windows Explorer windows are the main differences that users will immediately notice.

Novell

Novell Inc. is responsible for the NetWare® operating system. Novel Netware is a windows based operating system that incorporates most of the functionality of its Microsoft competitors; *Windows 2000* and *Windows XP*.

UNIX

The UNIX computer operating system from Bell Labs is still regarded as one of the most powerful, versatile, and flexible operating systems (OS) in the computer world. Its popularity is due to many factors, including its ability to run a wide variety of machines.

This operating system controls all generated user commands in the one system. The UNIX operating system was designed to let a number of users access the computer at the same time and share its resources leading each user to believe he or she is the only person working on the computer.

UNIX coordinates the use of the computer's resources, allowing one person, for example, to run a spell check program while another creates a document with each user oblivious to the activities of the others.


MAC OS


The operating system for Apple Macintosh systems, MAC OS is a 'windows' type system (Apple actually invented Graphic User Interface software) similar to Microsoft Windows products.

MAC OS systems however tend to require far less processing power to run making it a very popular choice in the graphics and video editing industries. Some current OS systems are delivered with a Windows 7 interface included (license required) allowing for greater compatibility with Microsoft Windows Server networks.

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Exercise 3

 Discuss with Operating System that is utilised within your workplace.

 Does this operating system meet the requirements as analysed in Exercise 2? Discuss Why/Why not?

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Computer Hardware

Computer (PC) hardware is made up of many different individual components which can be mixed and matched in many different combinations to suit the needs of the user. Whilst most of these components are required to run a computer, there are many variations, sizes and capacities that can produce vastly different operating results.

Regardless of their capabilities, computer hardware is normally categorised in three ways:

External – hardware located outside of the computer hard case. These can include:

- Monitor.
- Keyboard.
- Mouse.
- CD/DVD Rom.
- Floppy Disk Drive.
- Universal Serial Bus Port (USB).
- Parallel Ports.

Internal – meaning all components located within the computer hard cover itself. These components can include:

- Power Supply.
- Central Processing Unit (CPU).
- Hard Disk (HDD).
- System Memory (RAM).
- Motherboard.
- Video Card.
- Sound Card.
- Network Interface Card (NIC).

Peripherals – other components that are attached to computer hardware but are not actually part of the computer itself:

- Printers.
- Scanners.
- Speakers.
- Modems.
- USB Flash Drives.
- Routers.
- Smart Phones.

External Hardware

External hardware, as we have discovered, is the equipment that we physically see. In reality, due to the fact that most of it is connected via a USB connection, external hardware does not have that much of an effect on the system's ability to load and run computer software. It is the internal components that we really need to analyse for this although they do have to fit inside the external casings etc.

When dealing with external components, we need to be more aware of comfort and OH&S issues such as ease of use, ergonomics and noise levels emitted.

System Case

The box or outer shell that houses most of the computer, the system case is usually one of the most overlooked parts of the PC. The case performs several important functions for the PC, including protection for the computer circuits, cooling, and system organisation.



Figure 1 - Desktop Case



Figure 2 – Mini Case

Picture Source: www.dell.com , www.techeta.com

Keyboards

The keyboard is the main input device for most computers. It is used to input textual information to the PC. Most keyboards are connected to the PC via a USB connection either via cable or a wireless USB adaptor.

When choosing a keyboard, there are a number of factors that should be considered such as ergonomic layout of the keys, softness of keys (the harder, the noisier) or other inclusions such as:

- Sound and video controls
- Numeric keypad
- “Activation” keys for email, internet etc.



Figure 3 - An ergonomic keyboard



Figure 4 – Wireless keyboard with media controls

Picture Source: www.microsoft.com , www.logitech.com

Mouse

Until the invention of graphical user interface (GUI) operating systems such as Windows, the keyboard was the only way that information was entered into a PC. Mice are used in GUI environments to let users provide simple "point and click" instructions to the computer.

Originally, mice were connected to a PC via a PS/2 ports but almost all now utilise cabled or wireless USB or Bluetooth connections. As with keyboards, there are a number of variations to the original computer mouse. Most contain the original two button and roll wheel approach however the mouse ball has been replaced with an optical light and in some cases, extra buttons have been added to assist with web surfing and windows management processes.



Figure 5 - Mouse with scroll wheel and media buttons

Picture Source: www.logitech.com

With the use of computer hardware and systems becoming more and more prevalent in workplaces, users are spending large amounts of time using a computer mouse. In some cases, this excess use has led to OH&S issues such as Repetitive Strain Injury (RSI) and other muscle/ligament concerns. In a bid to counter this, some manufacturers have changed the actual shape or their mice to make them more ergonomic.



Figure 6 – Ergonomic Mouse

Picture Source: www.ergokomfort.com

Monitor

In simple terms, a monitor is a specialised, high-resolution screen, similar to a high-quality television. A monitor does not normally contain any software processing capabilities, simply displaying the data sent to it via the video card (although some contain USB ports that are connected to the PC via a USB connector cable).

The purpose of the monitor is to allow the user to see what it is that they are actually doing on the software. Until recently, desktop monitors utilised a Cathode Ray Tube (CRT) that allows the software to portray images as digital pixels. The measurement of the amount of pixels displayed is called the resolution (1024x768). The resolution used by a monitor is dependent on issues such as monitor size and video card capabilities.

Advancement of technology and the invention of laptop notebooks has seen the wider implementation of Liquid Crystal Displays (LCD). LCD (flat screen) monitors offer a clearer resolution and have quickly replaced CRT as the most common monitor type. If the intended task for the system involves high end graphical programming or video editing for example, a large High Definition monitor is a must.



Figure 7 - LCD Monitor

Picture Source: www.dell.com

USB: Universal Serial Bus

USB is an external bus standard that supports data transfer rates of 480 Mbps (USB 2.0) up to 5 Gbps (3.0). A single USB port can be used to connect up to 127 peripheral devices, such as mice, flash drives, digital cameras, and keyboards. Most peripherals are connected to PC's via the USB port.

USB connections allow devices to be quickly and easily connected and removed without the need for installation of extra peripheral specific cards and ports. One major advantage is that all major commercial operating systems support USB so when a digital camera is attached via USB for example, the digital images required can be extracted without the need to load any drivers or software. The only software required would be then to manage camera functions or to manipulate the images loaded.



Figure 8 - USB Plug

Picture Source: www.pixelperfectdigital.com

Plug and Play (PnP)

When a piece of hardware is connected to the pc via a USB connection, the computer operating system utilises a process known as "Plug and Play". Depending on the operating system (in this case, *Windows 7*), once a PnP device has been physically added to the computer, the operating system will detect and install the basic operating drivers. Once completed, a small window will appear to inform the user that the hardware is operational and ready for use.

