

**NEW ZEALAND INSTITUTES OF TECHNOLOGY AND POLYTECHNIC
QUALIFICATIONS IN INFORMATION & COMMUNICATIONS TECHNOLOGY**

PRESCRIPTION: HF500 HARDWARE FUNDAMENTALS

AIM OF MODULE:	Students will gain an understanding of the operation of computer systems, their impact on the environment, and of basic data communications.
CREDITS:	7
STUDENT LEARNING HOURS:	70
CONTENT REVISED:	2010
PRESCRIPTION EXPIRY DATE:	November 2013
NOTE:	THIS IS A COMPULSORY DIPICT L5 MODULE

Level and Assessment Schedule

TOPICS	Highest Skill Level				Suggested Assessment Percentage
	R	C	A	P	
1. CPU		*			20
2. Memory & Storage		*			20
3. I/O Devices		*			15
4. Categories of Computers		*			5
5. Process Control		*			5
6. Ergonomics & Environment		*			10
7. Data Communications		*			25
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LEARNING OUTCOMES

The student will:

- C 1 Identify the main components of a Central Processing Unit (CPU), including internal memory, explain the way in which they interact, and describe an example of a current CPU.
- C 2 Identify the main types of memory and storage and their characteristics, explain the various terms associated with these, and examine the various types of media used.
- C 3 List the features and describe the operation and application of various input and output devices.
- C 4 List the various categories of computers, identify their characteristics and examine their utilisation in modern applications.
- C 5 Explain process control systems, the concept of “real time” processing, event-driven systems, and the application of these systems.
- C 6 Explain the basic principles of ergonomics, the environmental requirements for equipment, and the environmental impact of e-waste.
- C 7 Define the various terms and identify the characteristics of the equipment associated with data communications and networks and describe the application of each.

CONTENT

The use of local installations as examples, where applicable, is recommended.

1 CPU

- The interaction of the CPU components will be examined using the execution of a simple instruction sequence such as: input 2 numbers, add them, and output the sum.
- A selection of current CPUs will be compared in the following terms:
 - name
 - manufacturer
 - word size
 - bus width
 - clock speed
 - MIPS

2 MEMORY & STORAGE

- In examining the various types of memory and storage the purpose and use of each type will be explained.

3 I/O DEVICES

- Input and output devices will include the following:

- keyboard
- mouse
- printer
- screen

and may include:

- modem
- scanner/digitiser
- optical reader
- voice recognition
- magnetic card reader
- plotter
- any other relevant device

4 CATEGORIES OF COMPUTERS

- The various categories of computers from PCs to Mainframes will be examined in light of their differences including:

- size
- cost
- memory and storage capacity
- processing capability

5 PROCESS CONTROL

- At least two examples of the application of these systems; eg. traffic light control, will be examined.

6 ERGONOMICS & ENVIRONMENT

- The application of ergonomics to workstation design will include discussion about Occupational Overuse Syndrome (OOS).

- Equipment environmental requirements will include considerations such as:

- temperature control
- provision
- quality and stability of power supply

- The environmental impact of e-waste will include consideration of:

- Harmful chemicals and poisonous metals used in the production of computers
- Safe disposal of computer equipment
- Recycling options
- Minimising waste

7 DATA COMMUNICATIONS

- Data communications terms will include:

- bandwidth
- baud/bit rate (and their units of measurement)
- frequency (and the unit of measurement)

- channel
 - protocol
 - host
 - terminal
 - local and remote
- Data communications equipment will include modems and multiplexers.
- Network terms will include:
- local area (LAN)
 - wide area (WAN)
 - switched (PSTN)
 - packet switching (PSN)
 - digital data network (DDN)
 - Integrated Services Digital Network (ISDN)
- and may include:
- frame relay
 - asynchronous transfer mode (ATM)
 - those terms associated with current network protocols
- Network topologies will include:
- point-to-point
 - multipoint
 - star
 - ring
 - bus
 - mesh
- Mention should be made of the practical implications and problems associated with the networking of terminal equipment.

Reading/Reference List:

Discovering Computers 2011: Complete (First Edition) by Gary B. Shelly & Misty E. Vermaat. ISBN 13: 978-1439079263 (Published by Course Technology; (February 25, 2010)