**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: | 2008 |
| PRESCRIPTION EXPIRY DATE: | Nov 2011 |
| NOTE: | THIS IS A COMPULSORY DIPICT L5 MODULE |

## Level and Assessment Schedule

| TOPICS | Highest Skill Level R | C | A | P | Suggested Assessment Percentage |
|---|---|---|---|---|---|
| 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 |
| | | | | | 100 |

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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.

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## 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

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## 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 associated with other 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 2009: Complete (Fifth Edition) by Gary B. Shelly, Thomas J. Cashman, Misty E. Vermaat. ISBN 13: 978-1-4239-1198-2 (Published by Course Technology; February 20, 2008)

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