

2021 NEW SYLLABUS

**INFORMATION  
COMMUNICATION  
TECHNOLOGY  
STUDY TEXT**

CPA & CS

MASOMO MSINGI PUBLISHERS

2021

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## UNIT DESCRIPTION

This paper is intended to equip the candidate with knowledge, skills and attitudes that will enable him/her to apply information communication technology effectively in solving business problems, decision making and in adapting to new working environments.

## LEARNING OUTCOMES

A candidate who passes this paper should be able to:

- Demonstrate proficiency in decision making using contemporary information communication technology tools
- Use various application packages to solve business issues
- Use data communication networks, the Internet and e-commerce in optimising business opportunities
- Apply data security measures and procedures
- Implement information systems legal, ethical and social issues.

Note to trainers: Trainers are advised to use a practical approach in offering tuition for this unit through infusing practical demonstrations in a computerized environment.

## CONTENT

### 1. Introduction to information communication technology (ICT)

- Introduction to information communication technology
- Computer hardware
- Computer software
- Programming languages and tools
- Information systems personnel and hierarchy
- Role of ICT in business environments
- Information centres
- Impact of ICT in business

### 2. Overview of operating systems

- Overview of an operating system
- Functions of an operating system
- Types of operating systems
- Computer booting
- Selection and acquisition of operating systems

### 3. An overview of application packages

### **3.1 Word processing**

- Features of a word processor
- Formatting and editing text
- Creating and formatting tables

### **3.2 Spreadsheets**

- Features of a spreadsheet program
- Formatting and editing spreadsheet
- Formulas
- Functions; sum, average, min, max, IPMT, NPV, PMT, PV, VLOOKUP, HLOOKUP, COUNT, IF, sumif
- Charts and graphs
- Working with pivot tables
- Linking formulas in different worksheets
- What if analysis; Goal seek and solver

### **3.3 Presentation software**

- Features of a presentation program
- Typing and formatting text in slide
- Slide show

### **3.4 Computerised accounting software**

- Capturing data
- Features of accounting software

## **4. Computer networks**

- Computer networks concepts
- Computer network hardware and software
- Data transmission media
- Types of computer networks
- Advantages and limitations of networking
- Cloud computing concepts, features and models
- Internet of things (IoT)

## **5. The Internet**

- Introduction to the Internet
- Applications of Internet
  1. Using search engines
  2. E-mails
  3. Electronic communication
- Internet services – e-mails, www, instant messaging
- Internet service providers (ISPS)

- Online collaborative tools; cloud sheets and cloud documents
- Impact of internet on society

**6. Data security**

- Overview of data security
- Threats and controls
- Data backup and restoration procedures

**7. Information systems in an enterprise**

- Overview of information systems
- Components of an information system
- Types and characteristics of information systems
- Systems in a functional perspective
- Enterprise applications and the business process integration

**8. e-Commerce**

- e-commerce concepts and features
- Models of e-commerce
- Impact of the internet on business
- E-commerce enabling software
- Business opportunities in e-commerce
- E-commerce infrastructure and platforms
- E-commerce payments methods
- Challenges of e-commerce
- Securing e-commerce transactions
- M-commerce and applications
- Digital marketing methods

**9. Mobile devices and applications**

- Overview of mobile computing
- Types of mobile devices
- Uses of mobile devices
- Overview of mobile applications
- Mobile browsers

**10. Systems analysis and design**

- Elements of information systems
- Systems theory
- Types of information systems
- Personnel involved in systems analysis and design
- Systems analysis and design concepts
- Systems development life cycle (SDLC)
  - Definition of systems development life cycle

- Phases of SDLC
- Advantages and disadvantages of SDLC
- Requirements elicitation
  - Stakeholder analysis
  - Need for requirements gathering
  - Process for requirements gathering
  - Requirements gathering tools and techniques
  - Gap analysis
  - Prioritisation of requirements

### 11. Legal, ethical and social issues in information systems

- Information systems ethical and social concerns
- The moral dimension of information systems
- The legal issues in information systems

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## TOPIC 1

# INTRODUCTION TO INFORMATION COMMUNICATION TECHNOLOGY (ICT)

## INTRODUCTION TO INFORMATION COMMUNICATION TECHNOLOGY

### What is ICT?

ICT is the short form of three basic terms – Information, Communication and Technology. The representation of data in a meaningful way is called *Information*.

The term *Communication* may be referred as imparting or exchanging of information by speaking, writing, or using some other medium while *Technology* refers to methods, systems and devices, which are a result of scientific knowledge, being used for practical purposes.

**Information and communications technology (ICT)** is often used as an extended synonym for information technology (IT). It is a more extensive term (i.e. more broad in scope) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

The term *ICT* is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution and management.

However, ICT has no universal definition, as "the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis." The broadness of ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g. personal computers, digital television, email, robots.

### Information technology

**Information technology (IT)** is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.

The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with information technology, including computer hardware, software, electronics, semiconductors, internet, telecom equipment, engineering, healthcare, e-commerce and computer services

## **Components of ICT**

Technological change is becoming a driving force in our society. Information technology is a generic term used for a group of technologies. James William (1982) has identified the following six major new technologies as most relevant in modern library and information system.

- Processor, memory and input/output channels,
- Micro. Mini and Large scale computers,
- Mass storage technologies,
- Data communication, networking and distributed processing,
- Data entry, display respond, and
- Software

These technologies can also be grouped into three major areas:

- Computer Technology,
- Communication Technology and
- Reprographic, Micrographic and Printing Technologies

### **A. Computer Technology**

The wide spread use of computer technology has made dramatic developments in the information transmission process in very field of human life. Highly sophisticated information services ranging from elaborate abstracting and indexing services to computerized data bases in almost all scientific disciplines are in wide use all over the world. The current developments in computer technology include mini computers, microcomputers, personnel computers, portable computers, super computers, speaking computer with IQS, microchip technology, artificial intelligence, software developments, C-ROM technology, machine-readable database, etc.

### **B. Communication Technology**

#### **1. Audio Technology**

Due to tremendous improvements and inventions, older gramophone records are now dwindling and much sophisticated cassettes and tape records are emerging. The outmoded AM (Amplitude Modulated) radio receivers are being received by the modern FM (Frequency Modulation) receivers. Thus, the new audio technology can be used in libraries and information centers for a wide variety of, recreation, etc.

#### **2. Audio-Visual Technology**

Motion pictures, Television, Videodisc are the main contributions of this technology.

Videodisc is a new medium containing prerecorded information, which allows the user to reproduce this information in the form of images on the screen of a television

receiver at, will. Videodisc technology offers high quality storage, image stability and speed of recall.

### **3. Facsimile Transmissions (Fax)**

Facsimile transmission has been boosted by the adoption of methods of data compression made possible by compact, reliable and inexpensive electronics. During the initial stages, the average speed of facsimile transmission was found to be 3.4 minutes per page. This technology was slow and it was replaced by micro facsimile. Satellite communication and fiber optics have increased the potential of facsimile transmission.

### **4. Electronic Mail**

E-mail is the electronic transmission and receiving of messages, information, data files, letters or documents by means of point-to-point systems or computer-based messages system.

## **C. Reprographic, Micrographic and Printing Technologies**

The technology of reprography made a big impact on the document delivery system. Most of the research libraries have reprographic machines and provide photocopy of any document on demand. Using reprographic and micrographic techniques, we can condense the bulky archives and newspapers and solve the storage problems. They also serve the purpose of preservation. They help in resource sharing and save the time of users.

### **1. Micro Forms**

Microforms is a term for all type of micro-documents whether they are transparent or opaque or in roll or sheet form. The varieties of microforms are microfilm, microfiche, ultra fiche, micro opaque, cards, computer about microfiche / micro film (COM).

### **2. Roll-film (microfilm)**

It is a continuous strip of film with images arranged in sequence. It is available in 100 feet roll with 35mm width.

### **3. Microfiche**

It is flat film having large number of images arranged in rows and columns. Standard sized microfiche of 4x6 inches accommodated 98 pages.

### **4. Printing Technology**

Thousands of years ago, people recognized the necessity of keeping records of their daily activities. Paper was invented and the art of writing and record keeping came to be defined. At present, lasers and computers have entered the field of printing.



Computer printers are three categories; line printers, dot matrix printer, and laser printers. Laser printers are popular today.

## **ICT SYSTEM**

An ICT system is a set-up consisting of hardware, software, data and the people who use them. It commonly includes communications technology, such as the Internet.

ICT and computers are **not** the same thing.

Computers are the hardware that is often part of an ICT system.

ICT Systems are used in a number of environments, such as:

- Offices
- Shops
- Factories
- Aircraft
- Ships

They're also used in fields such as:

- Communications
- Medicine
- Farming

ICT Systems are every day and ordinary, yet extraordinary in how they can add extra power to what we do and want to do.

### **The importance of ICT systems**

By using ICT systems we are:

- More productive - we can complete a greater number of tasks in the same time at reduced cost by using computers than we could prior to their invention
- Able to deal with vast amounts of information and process it quickly
- Able to transmit and receive information rapidly

### **Types of ICT system**

The three main types of ICT system to be considered for GCSE are:

#### **Information systems**

This type of ICT system is focused on managing data and information. Examples of these are a sports club membership system or a supermarket stock system.

#### **Control systems**

These ICT systems mainly control machines. They use input, process and output, but the output may be moving a robot arm to weld a car chassis rather than information.

## Communications systems

The output of these ICT systems is the successful **transport of data** from one place to another.

## Input, output and system diagrams

What comes out of an ICT system is largely dependant on what you put into the system to begin with.

ICT systems work by taking inputs (instructions and data), processing them and producing outputs that are stored or communicated in some way. The higher the quality and better thought-out the inputs, the more useful the outputs.

## Garbage In, Garbage Out (GIGO)

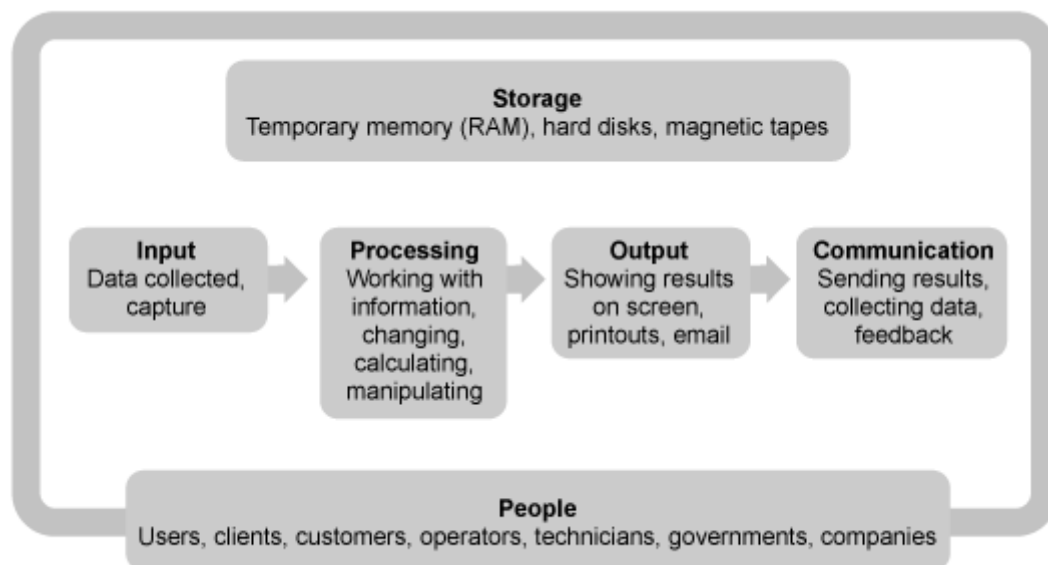
ICT systems cannot function properly if the inputs are inaccurate or faulty; they will either not be able to process the data at all, or will output data which is erroneous or useless.

**GIGO** is a useful term to remember in the exam - it can help explain many issues such as why validation is needed and why accurate data is valuable.

GIGO stands for Garbage In, Garbage Out

## An ICT system diagram

A system is an assembly of parts that together make a whole. ICT systems are made up of some or all of the parts shown in the diagram. Various devices are used for input, processing, output, and communication.

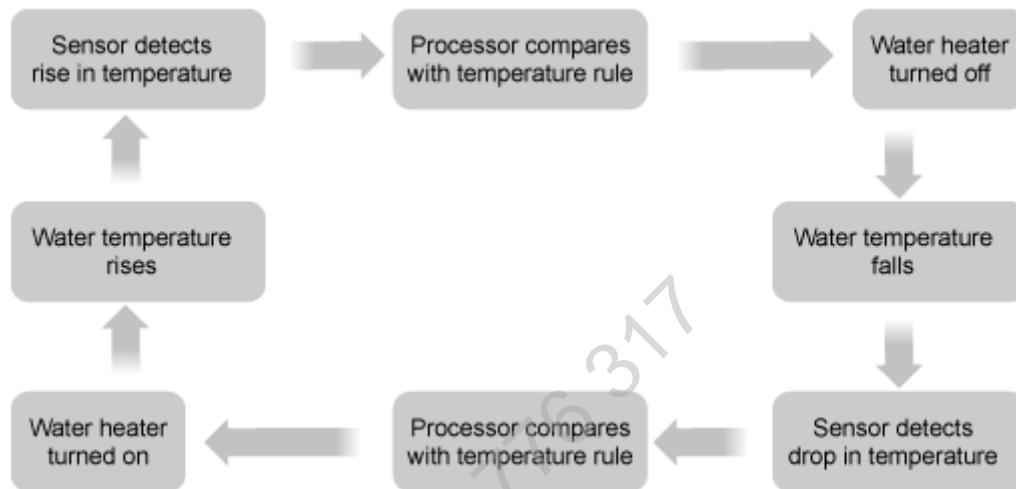


ICT systems can be made of some or all of the parts shown.

## Feedback

It is sometimes good to have feedback in an ICT system. This is when the output from a system **feeds back** to influence the input and the process repeats itself.

A good example is a system set-up to control water temperature in a tropical fish tank. The temperature of the water is taken as an input from sensors. Processing takes place and the temperature of the water is compared against the pre-programmed parameters, eg maximum/minimum temperature. The outputs include the automatic decision to either turn on or off the heater to warm or let the water cool. The output, ie the change in the water's temperature, is then fed back by the sensors as an input and the process repeats itself.



A system that monitors the water temperature of a fishtank and reacts accordingly.

Feedback can occur in information-based systems as well. Often an output will have a result on further inputs. For example, the output of accepting an online booking for an air ticket will be to reduce the number of tickets available.

The Measurement and control section has more information about the feedback cycle.