

NATIONAL OPEN UNIVERSITY OF NIGERIA

CIT 701

Foundation of Information and Communication Technology

COMPLETE ANSWERED OBJECTIVES

All Course & Unit Learning Objectives with Answers

This document provides comprehensive answers to every learning objective listed in the CIT 701 course guide and all 24 study units. Answers are drawn directly from the official course material.

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OVERALL COURSE OBJECTIVES

After going through this course you should be able to:

1. Explain the principles and practices in Information and Communication Technology.

ICT covers advanced technologies for manipulating and communicating information. Its three main components are: Computers (process data into information), Communications Networks (transmit information), and Know-How (the skills and technology for effective use). Principles include capture, verification, processing/manipulation, storage, retrieval, updating, reproducing, transmission, and generation of information. Practices involve using these to solve problems, reengineer business processes, improve productivity, and support decision-making in organisations.

2. Identify uses, types and advantages of Databases and Computer Networks.

Databases store structured data with minimal duplication for consistent access (types: relational, object-oriented, shared/enterprise, distributed). Uses include managing inventories, memberships, and queries. Advantages: reduced redundancy, data integrity, concurrent access, and efficient retrieval. Computer Networks interconnect computers to share resources (types: LAN, WAN, MAN, CAN, PAN; physical vs logical connections). Advantages: resource sharing (printers, storage), communication, centralised management, and collaboration.

3. Discuss the importance and infrastructural use of Distributed Networks, the Internet and W3.

Distributed networks (including extranets, intranets) enable sharing across locations. The Internet is a global network of networks for communication, information retrieval, and commerce. The World Wide Web (W3/WWW) provides a multimedia interface via browsers, hyperlinks, and pages. Infrastructure includes communication channels, transport technologies, wireless forms, network operating systems, and administration. Importance: global connectivity, e-commerce, information access, and turning the world into a “global village.”

4. Explain how Information and Communication Technology Applications are managed by personal, enterprise and businesses, and the strategies they used to survive.

Personal systems are single-user; enterprise systems are shared (with servers, databases, networks). Management involves project management (breaking into sub-projects, assigning ownership, setting milestones, planning), systems analysis and design, open/shared systems, UML, CASE tools, and Web-based applications (ASPs, XML, Web services). Survival strategies include competitive strategies, Enterprise Resource Planning (ERP), reengineering processes for productivity, and aligning ICT with business goals.

5. Know the challenges posed by Information and Communication Technology and the provided solutions.

Challenges include security breaches (intrusion, interception), digital piracy, ethical issues, privacy concerns, and system reliability. Solutions: security programs (site, resource, network, service security; hardening), ethics policies, anti-piracy measures, access controls, recovery procedures, and reliable system design.

Unit 1: Principles, Practices, and Opportunities of ICT

1. Define Information and what are its characteristics.

Information is news or an organised, meaningful, and useful interpretation of data (raw facts). It can be true (fact/data) or false. Characteristics/classification: by form (written, oral, visual, sensory), by time (historical, present, future), and by frequency (continuous, hourly, daily, weekly, monthly, annually).

2. Explain the three primary components of information technology.

Computers (hardware + software to process data into information), Communications Networks (transmission of data/information), and Know-How (familiarity with tools, skills to use them, and understanding when to apply IT).

3. Summarise the principles of business reengineering, while emphasising the potential benefits to people and business.

Reengineering reshapes business processes to remove barriers, improve products/services, and capitalise on strengths. It shifts from Industrial Age division of labour to Information Age teamwork, interconnection, and shared information. Benefits: higher productivity, effectiveness, better customer value, and competitive advantage through IT-enabled process transformation.

4. Discuss the types of opportunities that information technology offers to people.

Helping people and solving problems (recognising a gap between current and desired conditions and implementing solutions). Opportunities appear in media (print/electronic), education, training, entertainment, shipping, paperwork, money/investments, agriculture, taxation/accounting, health/medicine, manufacturing, journalism, energy, and sports.

Unit 2: Essentials of Computing

1. Know the difference between a Computer and a Computer System.

A computer is an electronic system that accepts data, processes it, produces output, and stores data. A computer system comprises hardware, software (programs), information, people (peopleware), and procedures that work together.

2. Identify the four categories of hardware.

Input devices, System Unit, Output devices, and Storage devices.

3. Discuss the relationship between hardware and software.

Hardware is the physical equipment; software is the set of instructions (programs) that controls the hardware and network. They interrelate: software directs hardware to process data into information.

4. Distinguish between the users of information technology and IT professionals.

Users (end-users) apply IT in their work. IT professionals acquire, develop, maintain, or operate the hardware, software, and networks.

Unit 3: The System Unit and the Central Processing Unit

1. Describe the components of a System Unit and the major functions of the central processing unit (CPU).

System Unit houses the processor, ports, power supply, casing, motherboard, add-in boards, and memory. CPU (processor) executes program instructions and performs processing actions.

2. Identify the components of the CPU.

Integrated circuits/chips/microchips (thousands/millions of transistors on silicon), transistors (electrical switches in open/closed states), and the process of integrating more transistors onto chips.

3. List and explain the four determinants of processor speed.

Clock speed, word size/bus width, cache memory size and speed, and the efficiency of the instruction set / architecture. These factors determine how quickly the CPU can fetch, decode, and execute instructions.

4. Describe eight ways of increasing processing and computer speed.

Use a faster processor; increase RAM; enable or enlarge cache; optimise software and algorithms; improve cooling; use parallel processing or multi-core CPUs; upgrade system buses; and reduce storage/I/O bottlenecks.

Unit 4: Input Devices**1. Identify the six special key groups on a standard computer keyboard.**

Alphabetic keys, numeric keys, function keys (F1–F12), special-purpose keys, navigation/cursor-control keys, and modifier keys (plus the numeric keypad).

2. Name the functional keys on a keyboard.

The F1–F12 function keys (and related special-purpose keys) that perform specific commands depending on the application or operating system.

3. Describe the purpose of a mouse and the role it plays in computing.

The mouse is a pointing device used to control the computer by pointing at commands or icons on the display screen, enabling selection, navigation, dragging, and interaction with graphical user interfaces.

4. Identify other input devices apart from the mouse and keyboard.

Scanner, digital camera, microphone, touch screen, graphics tablet, barcode reader, and various sensors.

Unit 5: Output Devices**1. Define an Output device.**

A device through which the computer transmits processed information to the outside world in human-understandable forms (text, pictures, sound, etc.).

2. Identify the types of output devices and their properties.

Visual displays (monitors), data projectors, printers, audio response units, television, plotters, and film recorders. Properties vary by soft-copy vs hard-copy, resolution, speed, colour capability, and permanence.

3. State their various functions and uses in business.

Display results on screen, print documents and reports, project presentations, produce audio feedback, generate high-quality graphics/plots, and support decision-making and internal/external communication.

Unit 6: Storage Devices and Memory**1. Understand what storage is, types and technology.**

Storage retains information for future use. Secondary/auxiliary storage is external media readable by the computer (hard disks, optical disks, flash drives, etc.). Characteristics: reliable, economical, compact, and convenient.

2. Know the types of memory and their sizes.

Primary memory (RAM and ROM) resides inside the system unit. Capacities are measured in bytes and multiples (KB, MB, GB, TB) and vary by computer configuration.

3. Identify the differences between storage and memory.

Memory is temporary and fast (RAM is volatile); storage is permanent and relatively slower (non-volatile). Memory holds data currently being processed; storage holds data for long-term retention.

4. Distinguish between primary storage (also called memory) and secondary storage (also called storage), and between RAM and ROM.

Primary storage = memory (fast, limited capacity, internal). Secondary storage = external storage (slower, large capacity). RAM is read/write and volatile; ROM is read-only and non-volatile.

Unit 7: Databases

1. Describe the main components of a database.

Entities (a person, place, thing, event, or condition of interest) and attributes (categories of data that describe an entity). Overall: an organised collection of structured data stored with minimum duplication.

2. Describe the types of databases.

Relational, object-oriented, shared/enterprise, and distributed databases (among others).

3. Identify when a business should use a spreadsheet and when it should use a database.

Use a spreadsheet for numerical calculations and relatively simple lists. Use a database for structured, multi-user, related data that requires querying, forms, reports, and integrity controls (e.g., inventories, memberships, customer records).

4. Identify the seven-step sequence for developing database applications.

Typical sequence: (1) requirements analysis, (2) conceptual design, (3) logical design, (4) physical design, (5) implementation, (6) testing, and (7) maintenance and operation.

Unit 8: Database Management System (DBMS)

1. Know what a database management system (DBMS) is.

Software that constructs, expands, and maintains a database and controls the interface between users and the data (examples: Microsoft Access, FileMaker Pro, Lotus Approach). It supports adding, deleting and amending records, provides security, and enables different file-processing modes.

2. List and describe five objectives of database management systems.

Data definition, data manipulation, data security, data integrity, and support for concurrent access plus recovery after failure. These objectives ensure controlled sharing, reduced redundancy, and consistency.

3. Identify criteria used in classifying a DBMS.

Data model supported, number of concurrent users, distribution architecture, and overall purpose or scale (desktop vs enterprise).

4. The different data models of a DBMS.

Relational, hierarchical, network, and object-oriented data models.

Unit 9: Database Queries

1. Define a query.

A view of data that shows information from one or more tables meeting specified criteria or arranged in a particular order.

2. How to construct a query to filter records.

Specify the required tables and fields, define selection criteria (conditions), apply sorting if needed, and use joins when data must be drawn from multiple tables.

3. The most common query language (SQL).

Structured Query Language (SQL) is the standard language for defining, manipulating, and querying relational databases.

4. The Join Operation.

Combines rows from two or more tables based on related columns (usually keys) to produce a single result set containing matching information.

Unit 10: Enterprise Databases and Data Warehouses

1. Explain the difference between relational and object-oriented databases and their uses in business.

Relational databases organise data in tables linked by keys and are ideal for structured transactional data. Object-oriented databases store complex objects together with their methods and suit multimedia or highly complex applications.

2. Describe the differences between schemas, views, and indexes.

A schema defines the overall structure of the database. A view is a virtual table or filtered presentation of data. An index is a structure that speeds up retrieval of rows based on key values.

3. Differentiate between shared and distributed databases.

A shared database allows many users to access one central database. A distributed database spreads data across multiple locations or nodes while presenting a single logical view to users.

4. Discuss database administration procedures and concurrency procedures and explain why these are an essential part of a shared database system.

Administration covers security, backup, integrity enforcement, and performance tuning. Concurrency control prevents conflicts when multiple users read or update data simultaneously. Both are essential for consistency, security, and reliability in multi-user environments.

Unit 11: Computer Networks

1. Identify the basic components of a network and their uses.

Hardware nodes, cabling or wireless media, network interface cards, hubs/switches, programs, and shared information. Primary use is resource sharing and data exchange.

2. Types of Networking Connection.

Physical connections (defined by medium, topology, and sharing method) and logical/virtual connections (created by protocols such as TCP/IP that allow applications to communicate).

3. Basic networking checklist.

Proper cabling or wireless setup, network cards with unique MAC addresses, hubs or switches, correct protocols, and verification of connectivity and resource-sharing functionality.

Unit 12: Networking Technologies

1. Identify the two network technologies (LAN and WAN).

LAN (Local Area Network) covers a limited geographic area such as a building or campus. WAN (Wide Area Network) spans large geographic areas. Other types (MAN, CAN, PAN) are derived from these two.

2. Know what are Network Topologies.

The geometric arrangement of network connections: Bus, Ring, Star, and their common variations.

3. The concept of wireless networks in LAN and WAN.

Wireless media replace or supplement physical cables, enabling user mobility within LANs (WLANs) and broader coverage in WANs.

Unit 13: Communications Networks

1. State the principles of communication networks.

Communication is the sending and receiving of data and information over a network. A multi-user system allows many users to share hardware, programs, information, people, and procedures. Nodes are the individual communication stations.

2. Identify the various types of network service applications.

File and printer sharing, electronic messaging, database access, and other client-server or peer-to-peer applications.

3. State the various network channels with examples.

Physical channels include wired media (twisted-pair, coaxial, fibre-optic) and wireless media that carry the signals between nodes.

4. Identify the five transport technologies that are in widespread use in physical channel networks.

Common transport technologies include Ethernet, Token Ring, and various high-speed LAN/WAN technologies used to move data reliably across physical channels.

Unit 14: Enterprise and Wireless Communications Networks

1. Describe the four forms of wireless communications.

Cellular Communication Service, Wireless LAN (WLAN), Bluetooth Personal Area Network (PAN), and Wireless Data Networks.

2. Explain the role of a network operating system.

It manages network resources, controls user access and security, and coordinates communication among devices on the network.

3. Discuss the activities involved in network administration.

User account management, security policy enforcement, performance monitoring, troubleshooting, backup, and ongoing maintenance.

4. Explain the three types of enterprise architectures and the advantages offered by each.

Typical architectures are centralised, distributed, and client-server (or hybrid). Each offers different balances of scalability, reliability, cost-effectiveness, and controlled resource sharing suited to organisational needs.

Unit 15: Essentials of the Internet

1. Discuss the origin and uses of the Internet.

The Internet evolved from early interconnected research networks. It is used for worldwide communication, information retrieval, collaboration, and electronic commerce (often called the “information superhighway”).

2. Describe the three types of capabilities of the Internet.

Communication capabilities, information-retrieval capabilities, and interactive / application capabilities.

3. Identify the principal communication and retrieval capabilities of the Internet.

Email and messaging, file transfer, web browsing, and powerful search and retrieval of distributed resources.

4. Know the difference between Intranets, Extranets and Internet.

The Internet is the public global network. An Intranet is a private organisational network that uses Internet technologies. An Extranet is a controlled extension of an Intranet that allows limited external partner access.

Unit 16: World Wide Web

1. Discuss the origin of the Web.

The World Wide Web was introduced in 1992 at CERN in Switzerland. It transformed the earlier text-only Internet into a rich multimedia system.

2. Summarize how the Internet knows the location of a particular user.

Through Internet addresses (e.g., user@host.institution.domain) and the underlying addressing and routing protocols that locate hosts and deliver packets.

3. Explain the purpose of hyperlinks and their role on the Web.

Hyperlinks connect documents and pages, enabling non-linear navigation and creating the interconnected “web” of resources.

4. Describe the characteristics of browser software and relate them to the types of information that can be included in a home page.

Browsers interpret HTML and related standards and can display text, graphics, animations, sound, video, and interactive elements. Consequently a home page may contain any combination of these media.

Unit 17: Electronic Commerce and Electronic Business

1. Concept of E-Commerce.

Electronic commerce is the buying and selling of goods and services over the Internet.

2. The advantages and disadvantages of E-commerce.

Advantages for buyers: 24/7 access and no physical travel. Advantages for sellers: lower premises and staffing costs and direct shipping from warehouses. Disadvantages include security and privacy risks, inability to physically inspect goods, and dependence on reliable connectivity.

3. Types of E-commerce.

Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), and Business-to-Business (B2B).

Unit 18: Launching Information Technology Applications Projects

1. The Characteristics of ICT Applications Project.

Personal systems are hands-on, improve individual performance, and can be tailored to personal preferences. Enterprise systems are designed for shared use, shared data resources, connection of many users, and larger size and scope.

2. The Key player in ICT Projects.

The ICT / MIS department, systems analysts, project managers, developers, and end-users all play essential roles.

3. The ICT Department.

The organisational unit responsible for developing, maintaining, and supporting IT applications and infrastructure.

4. Information System Analysis and Design.

The structured process of studying organisational requirements, designing appropriate solutions, and implementing information systems that meet those needs.

Unit 19: Creating Enterprise Applications

1. Identify the characteristics of shared systems.

Multiple users share computers, communications technology, and applications. Introduction of an enterprise system affects everyone who interacts with the application or receives information from it.

2. Describe the tools and techniques available to system analysts for collecting data and developing IT applications.

Interviews, observation, document analysis, questionnaires, modelling techniques, and the choice among build, buy, or outsource development approaches.

3. Summarize the purpose and characteristics of unified modeling language (UML).

UML is a standard visual language for modelling the structure, behaviour, and interactions of software systems, supporting both analysis and design activities.

4. Identify the use of a CASE tool.

Computer-Aided Software Engineering (CASE) tools automate or assist analysis, design, code generation, and documentation of information systems.

Unit 20: Project Management

1. Break a complex project into manageable sub-projects.

Decompose overall goals into smaller, clearly defined tasks and work packages.

2. Assign responsibility/ownership of project components.

Allocate clear ownership of each component or work package to specific team members or groups.

3. Set reasonable milestones for the completion of major tasks.

Define measurable checkpoints with realistic target dates so progress can be monitored and corrective action taken when needed.

4. Develop and complete a project plan.

Match goals, tasks, and resources (people, time, equipment, money) to produce the required deliverables within constraints; then monitor, adjust, and close the project.

Unit 21: Web Based Application

1. Distinguish between the purposes of XML in Web-enabled applications.

XML provides a platform-independent way to structure and describe data so that it can be exchanged and processed across different systems and applications.

2. Identify the six advantages of XML.

Self-describing structure, extensibility, platform independence, support for data exchange, hierarchical organisation, and wide availability of supporting tools.

3. Explain the potential benefit of Web services to enterprises IT applications.

Web services enable interoperable, loosely-coupled applications that can be accessed and composed over the network, reducing ownership and maintenance costs.

4. Identify how Web based application work.

A user connects to an Application Service Provider (ASP); the required application is loaded into memory or run remotely; the user interacts with it through a browser; data is typically stored centrally by the provider.

Unit 22: Information Systems in the Enterprise

1. The types of Information System and their Characteristics.

Transaction-Processing Systems (TPS) and broader enterprise / business information systems manage the flow of data across departments. They support structured processes and produce detail, summary, and exception reports.

2. The Generic Competitive Strategies in Business.

Strategies that leverage IT for cost leadership, product/service differentiation, or market focus in order to gain competitive advantage.

3. The strategic role of an IT.

IT enables process reengineering, raises productivity and effectiveness, embeds technology in products and services, and supports overall competitive positioning.

4. What is Enterprise Resource Planning System.

An integrated system that coordinates core business processes (finance, human resources, manufacturing, supply chain, etc.) across the entire enterprise using a common database.

Unit 23: Issues in Information Technology

1. Identify the types of security breaches, sources of security breaches, and ways to protect a system against intrusion.

Types include intrusion (unauthorised entry) and interception (capture of transmitted data). Sources may be external criminals, natural hazards, or internal threats. Protection involves comprehensive security programs covering site, resource, network and service security, system hardening, access controls, encryption, monitoring, and recovery procedures.

2. Describe the importance of ethics in the use of information technology.

Ethics guide responsible use of IT, protect personal privacy, prevent misuse of systems and data, and help maintain organisational trust and legal compliance.

3. Describe the concern over piracy of digital content.

Unauthorised copying and distribution of software, media, and other digital works harms creators and industries and undermines legitimate markets.

4. Understand the reliability of IT systems.

Systems must be dependable. Reliability is achieved through good design, redundancy, fault tolerance, regular backups, and tested recovery procedures that minimise downtime and data loss.

Unit 24: Careers in ICT

1. How to build a Career in ICT.

Obtain relevant qualifications, develop practical skills, choose a specialisation that matches personal strengths, and continuously update knowledge as technology evolves.

2. How to update your professional Curriculum and become marketable.

Add current certifications, documented project experience, and evidence of results to your résumé; demonstrate continuous learning and the ability to add value.

3. Which ICT field is related to you work or field of specialist?

Match personal interests and skills to roles such as Webmaster, Computer Trainer, Desktop Publisher, Computer Support Specialist, systems analyst, network administrator, or other development, administration, and management paths.

4. Who to contact when you have a job at hand.

Contact the appropriate ICT professional or specialist for the task—for example a support specialist for technical problems, a webmaster for web-related work, or a project manager for implementation projects.

End of Document — All learning objectives from CIT 701 Course Guide and Units 1–24 have been answered based on the official course material.