Introduction to IT & Computers

1.1 What is Information Technology (IT)?

Information Technology refers to the **study, design, development, management, and support of computer-based systems** including hardware, software, networks, and data.

Major Areas of IT

- **Computer hardware**
- **Software development**
- **Networking and internet systems**
- **Database management**
- **Cybersecurity**
- **Cloud computing**
- **Artificial intelligence and machine learning**

1.2 Role of IT in Society

IT has completely transformed modern life:

In Communication

- Email, instant messaging, video conferencing (Zoom, Teams).
- Social networking (Facebook, X, WhatsApp).
- Real-time global communication.

In Business

- Online banking, digital marketing, e-commerce.
- Enterprise systems (ERP, CRM).
- Automation of payroll, accounting, and logistics.

In Education

- E-learning platforms (Google Classroom, Moodle).
- Online exams and digital books.

- Virtual labs and simulations.

In Healthcare

- Electronic health records.
- Telemedicine (video consultations).
- Medical imaging (CT, MRI).

In Government (E-Government)

- Tax filing (iTax).
- Digital service portals (eCitizen).
- National databases (ID registration).

1.3 Basic Computer Terminologies

Term	Meaning
Hardware	Physical, tangible components.
Software	Instructions that tell the computer what to do.
Data	Raw facts (e.g., 20, “Female”).
Information	Processed data (e.g., “20 Years Old Female”).
Network	System of interconnected computers.
Server	Computer providing resources to others.
Client	Computer using resources from a server.
Peripheral	Device connected externally (printer, mouse).

1.4 History of Computing

1st Generation (1940–1958)

- Vacuum tubes
- Huge, consumed lots of power

- Machine language
- Examples: ENIAC, UNIVAC

2nd Generation (1959–1963)

- Transistors
- Faster, less heat
- Assembly language
- Smaller and more reliable

3rd Generation (1964–1970)

- Integrated Circuits (ICs)
- Multiprogramming
- Operating systems improved

4th Generation (1971–Present)

- Microprocessors
- Personal computers (PCs)
- Portable computers, smartphones
- Current AI and cloud era

☑ TOPIC 2: Fundamentals of Computer Operations

2.1 Detailed IPO Cycle

USER → [Input Device] → PROCESSING → [Output Device] → USER

INPUT

Examples: keyboard, mouse, scanner, microphone.

PROCESSING

Handled by the CPU through:

- **Arithmetic operations** — (+ − × ÷)
- **Logical operations** — comparisons (>, <, =)

- **Control operations** — directing sequence of instructions

OUTPUT

Examples: monitor, printer, speakers.

2.2 Other Essential Operations

Storage

- Temporary: **RAM**
- Permanent: **HDD, SSD, Flash drive**

Control

- Managed by the Control Unit (CU) of the CPU
- Ensures correct sequence of steps

2.3 Introduction to Operating Systems

Functions of an OS

1. **Processor management** – CPU scheduling.
2. **Memory management** – allocates memory to programs.
3. **Device management** – controls printers, keyboards, storage.
4. **File management** – storing, retrieving, organizing files.
5. **Security** – user authentication, encryption.
6. **Interface** – GUI/CLI for users.

Examples of Operating Systems

- **Desktop:** Windows, macOS, Linux
- **Mobile:** Android, iOS
- **Server:** Red Hat, Windows Server

2.4 Booting Process

Steps in Booting

1. Power ON
2. BIOS/UEFI starts
3. POST (Power On Self Test)
4. OS loaded from storage into RAM
5. Desktop/interface appears

Types of Booting

- **Cold boot** – from complete power off
- **Warm boot** – restart/reset

☑ TOPIC 3: Computer Hardware Basics

3.1 The Four Major Parts of a Computer System

1. **Input devices**
2. **Processing devices**
3. **Storage devices**
4. **Output devices**

3.2 Processing Hardware

Components of the CPU

- **ALU (Arithmetic Logic Unit)** – performs calculations
- **Control Unit** – directs operations
- **Registers** – high-speed storage inside CPU

Machine Cycle

1. **Fetch** instruction
2. **Decode** instruction
3. **Execute** instruction

4. **Store** result

3.3 Storage Hardware

Types of Storage

Storage	Description	Example
Primary	Temporary, fast	RAM
Secondary	Permanent	HDD, SSD
Offline	Removable	Flash disk, External HDD

3.4 Input Devices

- Optical mouse
- Joystick
- Barcode scanner
- Touchscreen
- MICR reader (banks)
- OMR (exams)

3.5 Output Devices

- Laser printers
- Inkjet printers
- Monitors (LCD, LED)
- Plotters (engineering drawings)

☑ TOPIC 4: Computer Software Basics

4.1 Types of Software

1. System Software

- Operating systems
- Utility programs
- Device drivers
- BIOS/UEFI

2. Application Software

- Word processing (MS Word)
- Spreadsheets (Excel)
- Presentation (PowerPoint)
- Databases (Access, MySQL)
- Browsers (Chrome)

4.2 System Software: OS Functions

1. **Multi-tasking** – running many programs at once
2. **Multi-user support** – many users accessing resources
3. **Networking** – connecting computers
4. **Error handling** – alerts and fixes

4.3 Compiling Systems

Method	How it works	Example
Compiler	Converts whole code at once	C, C++
Interpreter	Converts line-by-line	Python, JavaScript

4.4 Hands-on Software Installation

- Install OS

- Install antivirus
- Update drivers
- Remove unwanted programs

☑ TOPIC 5: Data and Data Files

5.1 Understanding Data

Characteristics of Good Information

- Accurate
- Timely
- Complete
- Relevant
- Secure

5.2 Bit, Byte, and Data Size Units

Unit	Value
1 byte	8 bits
1 KB	1024 bytes
1 MB	1,048,576 bytes
1 GB	1024 MB
1 TB	1024 GB

5.3 Data Types

- **Numeric** – integers, real numbers
- **Alphanumeric** – A–Z, 0–9
- **Logical** – TRUE/FALSE

- **Date/Time** – calendar values

5.4 File Types

Sequential Files

- Stored in a fixed order
- Used in payroll systems

Random Access Files

- Access any record directly
- Used in large databases

☑ **TOPIC 6: Disk Storage Fundamentals**

6.1 Disk Structure

A hard disk contains:

- **Platters** – circular disks
- **Tracks** – concentric circles
- **Sectors** – subdivisions of tracks
- **Clusters** – groups of sectors
- **Cylinder** – group of matching tracks on different platters

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6.2 Types of Disk Storage

1. Hard Disk Drive (HDD)

- Magnetic
- Cheaper, larger storage
- Slower than SSD

2. Solid State Drive (SSD)

- No moving parts

- Faster, more reliable
- More expensive

3. Optical Discs

- CD, DVD, Blu-ray
- Laser-based

4. USB Flash Drives

- Portable
- Durable
- Solid-state

6.3 Disk Storage Activities

- Disk formatting
- Partitioning drives
- Defragmentation
- Viewing disk usage
- Backup and restore
