

EDU SERUMX COLLEGE OF COMMERCE and MANAGMENT

SYLLABUS

Class – PGDCA 1st Semester

Subject – Fundamentals of Computer & Information Technology

Unit	Topics	Key Concepts
Unit 1	Knowing the Computer	Introduction to Computers: Strengths, limitations, fundamental uses.
		Types of Computers: Personal computers, desktops, laptops, and their uses.
		Generations of Computers: Evolution from early to modern computers.
		Personal Computer Components: CPU, RAM, hard drive, and other parts.
Unit 2	Number Systems and Binary Arithmetic	Number Systems: Binary, decimal, octal, hexadecimal, and their uses.
		Binary Arithmetic: Add, subtract, multiply, and divide binary numbers.
		Boolean Algebra and Logic Gates: AND, OR, NOT gates and simplification of logic expressions.
Unit 3	Computer Hardware and Software	Input/output Devices: Devices like keyboards, mice, monitors, and printers.
		Storage Devices: Hard drives, SSDs, USB drives, and cloud storage.
		Software Basics: Types of software (system and application), and their roles.
		Operating Systems: Basics of OS like Windows and Linux, functions, and booting process.
		DOS Basics: DOS commands, internal and external commands, and file types.
Unit 4	Computer Viruses and Communication	Computer Viruses: Types of viruses, how they spread, and ways to protect your computer.
		Communication and IT: How networks work, communication types, and media (wired and wireless).
		Modems: Purpose, types, and characteristics of modems.
Unit 5	Networks and Internet Basics	Networks: Types of networks (LAN, WAN), topology, and connectivity devices like routers.
		Internet Basics: History, services (email, web), terminologies, and netiquette.

Unit - 1

Knowing the Computer

1. Introduction to Computers

- **What is a Computer?**
A computer is a machine that processes data to give meaningful results. It works with instructions we provide to solve problems or perform tasks.
 - **Strengths of Computers:**
 - **Speed:** Computers work much faster than humans, processing thousands of tasks in seconds.
 - **Accuracy:** If programmed correctly, computers give accurate results without making mistakes.
 - **Storage:** Computers can store large amounts of data, like files, photos, and videos, for a long time.
 - **Multitasking:** They can perform many tasks at the same time, like playing music while browsing the internet.
 - **Limitations of Computers:**
 - They can't think or make decisions on their own; they only follow instructions (programs).
 - They rely on electricity to work.
 - They can't perform tasks they aren't programmed for.
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2. Types and Generations of Computers

- **Types of Computers:**
 - **Desktop Computers:** Regular computers used on a desk; suitable for home and office use.
 - **Laptops:** Portable computers that you can carry anywhere.
 - **Tablets and Smartphones:** Small devices with touchscreens that function like computers.
 - **Servers:** Powerful computers that store and manage data for other computers in a network.
 - **Supercomputers:** Extremely fast computers used for complex tasks like weather forecasting and scientific research.
- **Generations of Computers:**
 - **First Generation:** Used vacuum tubes (large and slow, but the first step in computing).
 - **Second Generation:** Used transistors (smaller, faster, and more reliable than vacuum tubes).
 - **Third Generation:** Used integrated circuits (ICs), making computers smaller and cheaper.

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- **Fourth Generation:** Uses microprocessors, leading to personal computers (PCs).
- **Fifth Generation:** Focuses on artificial intelligence (AI) and advanced computing.

3. Personal Computers (PCs)

- **What is a Personal Computer?**

A personal computer is a small, affordable computer designed for individual use, like studying, working, or entertainment.

- **Uses of Personal Computers:**

- Writing documents, creating presentations, and sending emails.
- Watching videos, listening to music, and playing games.
- Browsing the internet and using social media.

- **Components of a PC:**

- **CPU (Central Processing Unit):** The "brain" of the computer that processes all tasks.
- **RAM (Random Access Memory):** Temporary memory used while the computer is running; it makes multitasking faster.
- **Hard Drive (Storage):** Where files, documents, and software are saved permanently.
- **Monitor:** The screen where you see everything.
- **Keyboard and Mouse:** Devices used to input data and control the computer.

Unit - 2

Number Systems and Binary Arithmetic

1. Number Systems

Number systems are ways to represent and work with numbers. Computers and humans use different systems.

- **Binary System (Base 2):**
 - Used by computers.
 - It only uses two digits: **0** and **1**.
 - Example: 1010 in binary means **10** in decimal.
 - Computers use binary because their circuits only have two states: ON (1) and OFF (0).
 - **Decimal System (Base 10):**
 - Used in daily life.
 - It has ten digits: **0, 1, 2, 3, 4, 5, 6, 7, 8, 9**.
 - Example: 123 in decimal is the number we understand.
 - **Octal System (Base 8):**
 - Uses eight digits: **0 to 7**.
 - Often used in computing to simplify binary numbers.
 - Example: Binary **110** = Octal **6**.
 - **Hexadecimal System (Base 16):**
 - Uses 16 digits: **0 to 9** and letters **A to F** (A = 10, B = 11, ..., F = 15).
 - Commonly used in programming.
 - Example: Binary **1111** = Hexadecimal **F**.
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2. Binary Arithmetic

Binary arithmetic is like normal math, but only uses **0** and **1**.

- **Binary Addition:**
 - Rules:
 - $0 + 0 = 0$
 - $0 + 1 = 1$
 - $1 + 1 = 10$ (carry 1 to the next column).

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- Example:

```
markdown
Copy code
  101
+ 110
-----
1011
```

- **Binary Subtraction:**

- Rules:
 - $0 - 0 = 0$
 - $1 - 0 = 1$
 - $1 - 1 = 0$
 - If $0 - 1$, borrow from the next column.
- Example:

```
markdown
Copy code
 1010
- 0111
-----
 0011
```

- **Binary Multiplication:**

- Rules:
 - $0 \times 0 = 0$
 - $0 \times 1 = 0$
 - $1 \times 0 = 0$
 - $1 \times 1 = 1$
- Example:

```
markdown
Copy code
  101
×   10
-----
1010
```

- **Binary Division:**

- Works like normal division, but with binary numbers.
- Example: Divide **1010** by **10** gives **101**.

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3. Boolean Algebra and Logic Gates

Boolean algebra is the math of logic. Computers use it to make decisions.

- **Logic Gates:** These are small circuits that process binary inputs (0 or 1) to give outputs.
 - **AND Gate:** Gives **1** only if both inputs are **1**.
 - Example: 1 AND 0 = 0.
 - **OR Gate:** Gives **1** if at least one input is **1**.
 - Example: 1 OR 0 = 1.
 - **NOT Gate:** Flips the input (1 becomes 0, and 0 becomes 1).
 - Example: NOT 1 = 0.
- **Boolean Rules:**
 - $A + 0 = A$ (OR Rule)
 - $A \times 1 = A$ (AND Rule)
 - $A \times 0 = 0$ (AND Rule)
 - $A + A = A$ (Idempotent Rule)
 - $\text{NOT}(A) \times A = 0$ (Complement Rule)

Unit - 3

Computer Hardware and Software

1. Input/Output Devices

Input and output devices are the tools that let you communicate with the computer and get results from it.

- **Input Devices:**

These devices send information **to the computer**.

- **Keyboard:** Lets you type text, numbers, and commands.
- **Mouse:** Helps you click, select, and navigate on the screen.
- **Scanner:** Converts printed documents or images into digital form.
- **Microphone:** Records your voice or sounds.

- **Output Devices:**

These devices show you the results **from the computer**.

- **Monitor (Screen):** Displays what the computer is doing, like videos, text, or games.
 - **Printer:** Prints out documents or pictures from the computer onto paper.
 - **Speakers:** Play sounds, music, or voices from the computer.
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2. Storage Devices

Storage devices help you save your work and data for later use.

- **Hard Drive (HDD/SSD):**

- The computer's main storage where everything (like files, programs, and the operating system) is saved.
- HDDs are slower but cheaper; SSDs are faster but more expensive.

- **USB Drive (Pen Drive):**

- A small, portable device to store and transfer files easily.
- Great for carrying data between different computers.

- **Cloud Storage:**

- Stores files on the internet instead of on your computer.
 - Examples: Google Drive, Dropbox.
 - You can access your files from anywhere with an internet connection.
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3. Operating Systems (OS)

An operating system is the main software that controls the computer and makes everything work together.

- **What Does an Operating System Do?**
 - Manages hardware (like the CPU, memory, and storage).
 - Allows you to run programs (like Word, Excel, or a browser).
 - Helps you interact with the computer using a user-friendly interface.
- **Examples of Operating Systems:**
 - **Windows:** The most common OS for personal and office computers.
 - **macOS:** Used in Apple computers like MacBook and iMac.
 - **Linux:** A free and open-source OS used by developers and tech-savvy users.
 - **Android/iOS:** Used in smartphones and tablets.
- **Key OS Functions:**
 - **Booting:** Starts the computer and loads the operating system.
 - **File Management:** Helps you organize files into folders.
 - **Multitasking:** Lets you run multiple programs at the same time.

UNIT – 4

Computer Viruses and Communication

1. Computer Viruses

A computer virus is harmful software (program) designed to disrupt your computer or steal your data.

- **What Are Computer Viruses?**
 - Small programs that can damage files, slow down your computer, or even steal personal information.
 - **How Do Viruses Spread?**
 - **Email Attachments:** Opening suspicious files in emails.
 - **Downloads:** Downloading infected files or apps from untrusted websites.
 - **USB Drives:** Sharing files using infected USB drives.
 - **Pop-Ups:** Clicking on fake ads or pop-ups online.
 - **Types of Computer Viruses:**
 - **Trojan Horse:** Pretends to be a useful program but harms your system.
 - **Worms:** Spread across networks automatically, without user action.
 - **Ransomware:** Locks your files and demands money to unlock them.
 - **How to Protect Your Computer:**
 - **Antivirus Software:** Install and update antivirus programs like Norton or McAfee.
 - **Avoid Suspicious Links:** Don't click on unknown emails or pop-ups.
 - **Backup Data:** Save your important files on an external drive or cloud storage.
 - **Keep Software Updated:** Regular updates fix security holes.
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2. Communication and IT

Computers communicate with each other using networks and the internet to share data.

- **How Computers Communicate:**
 - **Networks:** A group of computers connected together to share files and resources.
 - Example: Your office network or Wi-Fi at home.
 - **Internet:** A global network that connects millions of computers worldwide.
- **What is IT (Information Technology)?**
 - IT is the use of computers and networks to store, share, and manage information.

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- **Key Communication Tools in IT:**
 - **Modem:** A device that connects your computer to the internet.
 - Converts digital data into signals that can travel through telephone or cable lines.
 - **Routers:** Direct internet traffic and connect multiple devices to one network.
- **Types of Networks:**
 - **LAN (Local Area Network):** Small networks like in homes or offices.
 - **WAN (Wide Area Network):** Large networks like the internet.
 - **Wireless Networks (Wi-Fi):** Networks that don't use cables; devices connect wirelessly.

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Unit – 5

Computer Networks and Internet Basics

1. Computer Networks

A computer network is a group of connected computers that share information and resources (like printers or the internet).

- **Types of Networks:**
 - **Internet:** A global network that connects millions of computers worldwide.
 - **Intranet:** A private network used within an organization (e.g., in schools or offices).
 - **LAN (Local Area Network):** A small network for homes, schools, or offices.
 - Example: Computers connected in a single building.
 - **WAN (Wide Area Network):** A large network that connects computers across cities or countries.
 - Example: The internet is the biggest WAN.
 - **Network Topologies:** (How computers are arranged in a network)
 - **Star Topology:** All devices connect to a central hub or switch.
 - If the hub fails, the whole network stops.
 - **Bus Topology:** All devices connect to a single cable.
 - If the cable breaks, the network stops working.
 - **Ring Topology:** Devices are connected in a circular shape.
 - Data flows in one direction, and if one device fails, it can affect others.
 - **Network Devices:**
 - **Router:** Directs data between different networks (e.g., connects your home network to the internet).
 - **Switch:** Connects devices within the same network and allows them to share information.
 - **Modem:** Converts signals from your internet provider into a format your computer understands.
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2. Internet Basics

The internet is a massive global network used for communication, information, and entertainment.

- **History of the Internet:**
 - Started as ARPANET in the 1960s for military communication.
 - Became the "World Wide Web" in the 1990s, allowing anyone to browse and share information.

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- **Common Internet Services:**
 - **Email:** Sending messages and files instantly to people anywhere in the world.
 - **Search Engines:** Tools like Google that help you find information online.
 - **Social Media:** Platforms like Facebook, Instagram, or Twitter for connecting with friends and sharing updates.
 - **Streaming:** Watching videos (YouTube) or listening to music (Spotify) online.
- **Netiquette (Online Behavior):**
 - **Be Respectful:** Treat others politely in emails, chats, or social media.
 - **Don't Spam:** Avoid sending unnecessary messages or posting the same thing repeatedly.
 - **Protect Privacy:** Don't share your personal information, like passwords or address, online.
 - **Avoid Plagiarism:** Give credit if you use someone else's work or ideas.