B.P.E.S.
Semester- III
CD 101 : Fundamental of Data Science & MS Excel

Information and Communication Technology (ICT)

Meaning of ICT

- ICT stands for **Information and Communication Technology**.

- **Information and communication technology (ICT)** refers to all technological tools, systems, and resources used for handling, accessing, transmitting, storing, processing, and communicating information in digital or electronic form.

- ICT is a broad term that combines computer technologies with communication technologies, including hardware (computers, mobile devices), software, telecommunications networks (internet, telephony), and data systems. It covers everything from simple calculators and telephones to advanced computer networks and internet-based systems. In essence, ICT enables the collection, processing, storage, and sharing of information through channels such as voice, text, audio, video, and data networks

- In simple words, **ICT is the use of digital technologies to handle information and to support communication**.

- It is not only about computers but also includes:

  o Smartphones, tablets, smartboards

  o Internet, Wi-Fi, cloud computing

  o Social media, e-mail, video conferencing

  o Software for teaching, learning, business, and research

👉 Example: A teacher using a smartboard, students attending online classes on Zoom/Google Meet, and assignments submitted through Google Classroom – all are applications of ICT.

Need & Importance of ICT

1. **Speed of Communication**

   o In earlier times, people depended on postal services which took days or even weeks to deliver information. ICT has completely changed this scenario.

   o With the help of emails, instant messaging, and video calls, people can now communicate in **real-time** irrespective of geographical distance.

   o This is crucial for businesses, education (online classes), and even personal life.

2. **Wide Access to Information**

   o ICT provides **unlimited access to knowledge** through the internet, digital libraries, online databases, and government portals.

   o Anyone can get information about **current affairs, scientific research, educational resources, and government schemes** at their fingertips.

- o This reduces dependency on physical books or offices, making information universally available.

3. **Efficiency and Accuracy**

    - o ICT tools like computers, software, and databases can store and process a large amount of data in seconds, which would otherwise take hours or days manually.

    - o It reduces **human errors** in calculations, record-keeping, or reporting.

    - o For example: Banks use ICT to manage customer accounts, ensuring secure and accurate transactions.

4. **Globalization**

    - o ICT has made the world a **"global village"** by connecting people across countries.

    - o Businesses can sell products internationally through e-commerce websites.

    - o Students can learn from foreign universities through online courses.

    - o It allows cultural exchange, international collaborations, and global awareness.

5. **Better Teaching and Learning**

    - o ICT has revolutionized education by introducing **smart classes, multimedia presentations, virtual laboratories, and e-learning platforms**.

    - o Teachers can use videos, animations, and simulations to explain complex concepts more effectively.

    - o Students get access to **online courses, digital notes, and recorded lectures**, enabling personalized learning at their own pace.

6. **Decision Making**

    - o Governments, companies, and institutions depend on ICT tools to analyze large data sets before taking major decisions.

    - o For example: Weather forecasting uses ICT for accurate predictions; businesses use data analysis to understand customer preferences.

    - o This ensures that decisions are **evidence-based, reliable, and result-oriented**.

7. **Automation**

    - o ICT has automated many routine tasks, reducing manual labor and saving time.

    - o Examples: Online ticket booking, ATM withdrawals, digital payments, automatic billing in supermarkets.

    - o This not only increases **productivity** but also ensures **convenience** for people in daily life.

Applications of Computers in Physical Education

Computers are not only used in offices and schools but also in the field of **sports and physical education**. They make the work of teachers, coaches, and players easier and more effective.

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1. Record Keeping

- Computers help in keeping all the records of students and players.
- Example: Attendance, marks in fitness tests, medical history, achievements in sports.
- It saves time and avoids mistakes compared to writing in registers.

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2. Studying Sports Performance

- With the help of video cameras and computers, we can study how a player is running, jumping, or throwing.
- Software can slow down the video and show mistakes clearly.
- Example: A cricket coach can check a bowler's action or a sprinter's stride using video analysis.

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3. Checking Fitness and Health

- Fitness watches and apps connect to computers and show data like heart rate, calories burned, steps taken, and sleep.
- Teachers and coaches can use this data to know how healthy or fit a student is.
- Example: A PE teacher checks the running distance of students using a GPS watch.

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4. Teaching and Learning

- Computers make learning more interesting by using **PowerPoint, videos, animations, and online classes**.
- Instead of only reading books, students can **see pictures, watch demonstrations, and even practice virtually**.
- Example: Learning human anatomy from 3D computer models.

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5. Research Work

- In higher studies, research in physical education needs a lot of data.
- Computers help in collecting, analyzing, and presenting data through graphs and charts.
- Example: A research scholar studying running gait patterns uses computer software for analysis.

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6. Organizing Sports Events

- Computers help in making **fixtures, score sheets, schedules, and certificates** during sports events.
- Example: During a school sports day, computers are used to quickly prepare results and medals list.

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7. Communication

- Teachers, students, and coaches can share information through emails, online groups, and video calls.
- Example: Online fitness classes during lockdown.

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8. Making Training Plans

- Coaches use software to design training plans for athletes.
- Computers can show how much exercise, rest, and diet is required for improvement.
- Example: A marathon runner's weekly training schedule can be prepared on the computer.

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9. Motivation and Fun

- Computers are also used in sports games, fitness apps, and VR (Virtual Reality) sports.
- These make exercise **fun and motivating** for students.
- Example: Step-count challenges or cycling games on a screen.

Components of Computer, Input and Output Device

Components of a Computer

A computer is an electronic machine that works on the principle of **Input → Process → Output**. It accepts instructions from the user, processes them, and then produces results. To perform these tasks effectively, the computer is made up of four major components: the input unit, the central processing unit (CPU), the memory/ storage unit, and the output unit. Each of these parts has its own special role, but together they make the computer function as one complete system.

Input Unit

The input unit is the part of the computer that allows users to feed information into the system. Just like we use our senses to receive information from the outside world, the computer uses input devices to collect data. These devices take our information in the form of text, numbers, voice, or pictures and convert it into a language that the computer understands, which is binary code (0s and 1s). Common input devices include the **keyboard**, which helps us type letters and numbers, and the **mouse**, which is used to point and click on different items on the screen. Devices such as scanners, microphones, and webcams also act as input tools by providing images, sound, and video to the computer. Without the input unit, a computer would have no way of knowing what the user wants it to do.

Central Processing Unit (CPU)

The central processing unit, also called the **brain of the computer**, is the most important part of the system. It is responsible for interpreting and carrying out instructions given by the user. The CPU has two main sections. The **Control Unit (CU)** works like a manager or a traffic policeman, directing the flow of data and instructions between different parts of the computer. On the other hand, the **Arithmetic and Logic Unit (ALU)** does the actual work of performing mathematical calculations like addition or multiplication, and logical decisions like comparing two values. For example, when you type a math problem into the computer, the control unit sends the information to the ALU, which then solves it and sends the result back for display. Without the CPU, the computer cannot think, calculate, or make decisions.

Memory / Storage

Every computer needs a place to store information, both temporarily and permanently. This is handled by the memory or storage unit. **Primary memory** includes RAM (Random Access Memory) and ROM (Read Only Memory). RAM is fast but temporary, meaning the information stored here is lost when the computer is turned off. It is mainly used while you are working on a file or running a program. ROM, however, contains permanent instructions that are necessary for the computer to start up, such as the booting process. **Secondary storage** devices like hard drives, SSDs, CDs, DVDs, and pen drives are used for permanent storage. This is where your files, documents, pictures, and videos are saved for long-term use. Storage acts as the memory of the computer, just as humans remember things for future reference.


Output Unit

After the computer processes the input data, it needs to present the results to the user. This job is done by the output unit. Output devices convert the processed information back into a human-readable form. The most common output device is the **monitor**, which displays text, images, and videos. Another popular device is the **printer**, which gives results on paper in the form of hard copies. **Speakers and headphones** provide sound output, while **projectors** display information on a large screen for group viewing, such as in a classroom or seminar. The output unit is essential because it gives meaning to the entire process; without it, the user would never see the results of their commands.

How the System Works Together

The functioning of a computer can be explained with a simple flow: **Input → Processing → Output → Storage**. For example, if you type "2 + 3" on the keyboard, this is the input. The CPU processes the calculation and decides the result. The monitor then displays the answer "5" as the output. If you save this work, it is stored permanently in the hard disk. This sequence shows how every component is linked and equally important in making the computer work.
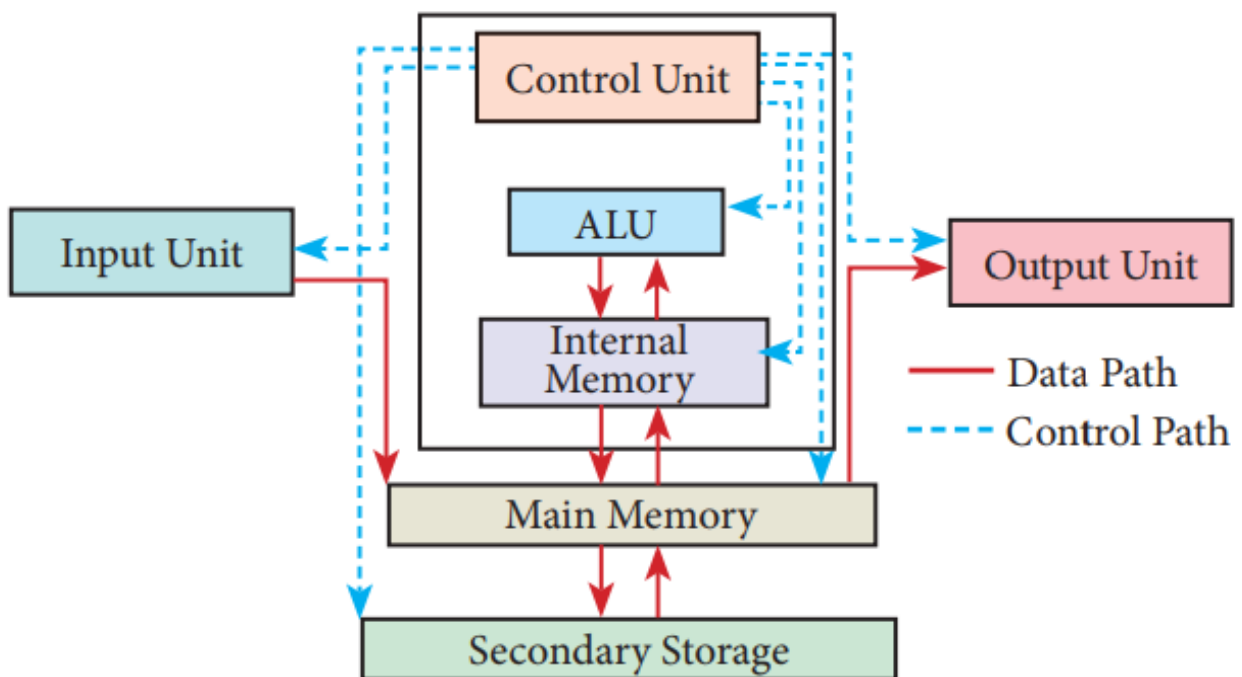
Application Software in Physical Education and Sports

Application software refers to computer programs that are designed to perform specific tasks for the user. In the field of **Physical Education and Sports**, such software is widely used to improve teaching, training, research, and management. These programs help teachers, coaches, players, and researchers in recording, analyzing, and enhancing performance. Let's look at the major applications:

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1. Sports Performance Analysis Software

One of the most important uses of application software in sports is analyzing the performance of athletes. Software such as **Dartfish, Kinovea, and Silicon Coach** allows coaches to record, slow down, and review movements in detail. This helps in correcting techniques, identifying mistakes, and improving skills. For example, a sprinter's running stride can be studied frame by frame to improve running gait and efficiency.

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2. Fitness and Training Software

In Physical Education and sports training, fitness monitoring applications are very popular. Software such as **Fitness Coach, MyFitnessPal, and Polar Flow** tracks heart rate, calories burned, workout intensity, and overall fitness progress. These tools help physical education teachers and coaches design personalized training programs for athletes. For instance, a long-distance runner can monitor their endurance progress and adjust training loads accordingly.

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3. Sports Management Software

Physical education institutions, sports academies, and clubs use management software to organize activities, schedule games, and maintain records. Applications like **TeamSnap, LeagueApps, and SportsEngine** are used for event scheduling, player registrations, communication, and result management. This saves time and ensures smooth coordination among players, coaches, and administrators.

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4. Health and Rehabilitation Software

Rehabilitation plays a vital role in sports when athletes suffer injuries. Special software programs like **PhysioTools or PhysiApp** provide exercise plans, demonstrations, and progress tracking for injured players. These programs help physiotherapists and trainers to monitor recovery and guide athletes safely back to training. For example, after a hamstring injury, software can suggest step-by-step stretching and strengthening exercises.

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5. Research and Data Analysis Software

In higher education and sports science, application software such as **SPSS, MATLAB, and Excel** is used for research and statistical analysis. Researchers can collect large amounts of data on fitness levels, biomechanics, or psychology of athletes and analyze it scientifically. This helps in producing evidence-based knowledge and developing better training methods.

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6. Virtual Reality (VR) and Simulation Software

Modern sports are also adopting advanced application software like VR simulations. These programs create **virtual training environments**, where athletes can practice strategies or skills without being physically present on the field. For example, a goalkeeper can train against virtual penalty kicks to improve reaction time.

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7. Educational Software in Physical Education

In classrooms, physical education teachers use software like **PowerPoint, Smart Boards, and Google Classroom** to teach theoretical aspects of sports. Animated simulations and video lectures make learning more interesting and interactive for students.

Unit – II: MS Word

Introduction to MS Word

MS Word (Microsoft Word) is a popular **word processing software** developed by Microsoft. It is part of the **Microsoft Office package** and is widely used for creating, editing, formatting, and printing documents. A word processor is different from a simple text editor because it not only allows typing but also provides advanced features like inserting pictures, tables, graphs, hyperlinks, and even designing professional reports.

MS Word is used in **education, business, research, administration, and personal work** because it saves time, improves presentation, and allows error-free document creation. It is much more convenient than writing by hand or using a typewriter, as mistakes can be easily corrected, formatting can be changed instantly, and documents can be stored digitally for future use.

Key Features of MS Word

1. **User-Friendly Interface:** It has a graphical interface with menus, toolbars, and ribbons, making it easy to use.

2. **Text Editing:** You can write, copy, paste, delete, or move text quickly.

3. **Formatting Options:** Allows changing font style, size, color, alignment, spacing, and page layout.

4. **Inserting Objects:** You can add images, charts, tables, and hyperlinks.

5. **Spell Check and Grammar:** MS Word automatically checks spelling and grammar errors.

6. **Templates:** Provides ready-made formats for resumes, letters, reports, etc.

7. **Save and Print:** Documents can be saved in different formats (.docx, .pdf) and printed easily.

8. **Collaboration:** In modern versions, multiple users can edit the same document online through OneDrive.

Uses of MS Word in Daily Life and Education

- Preparing assignments, reports, and research papers in universities.

- Drafting official letters, notices, and circulars.

- Creating resumes, cover letters, and project proposals.

- Designing study materials, question papers, and newsletters.

- Writing books, articles, or magazines with professional layouts.

How to Create, Open and Save a Document in MS Word

MS Word is a widely used word processing application. Here's how to create, open, and save documents using dialog boxes in MS Word.

1. Creating a New Document

- **Step 1:** Open MS Word.
- **Step 2:** To create a new document, you can click on the **File** tab on the Ribbon.
- **Step 3:** Click on **New**.
- **Step 4:** You will see options like **Blank document** and various templates.
- **Step 5:** Click on **Blank document** to start a new document.

A new blank document will open where you can start typing.

2. Opening an Existing Document

- **Step 1:** Click the **File** tab.

- **Step 2:** Click on **Open**.

- **Step 3:** There are several options:

    - **Recent Documents**: Shows documents you have recently opened.
    - **This PC** or **Browse**: Opens a dialog box to search files on your computer.
- **Step 4:** If you click **Browse**, an **Open** dialog box appears.
    In the **Open** dialog box:

    - Navigate to the location where your document is saved.
    - Click the document name to select it.
    - Click **Open** to open the document.

3. Saving a Document

- **Step 1:** Click the **File** tab.
- **Step 2:** Click **Save As** if this is a new document or if you want to save with a different name or location.
- **Step 3:** The **Save As** dialog box appears.

In the **Save As** dialog box:

- Choose the folder/location where you want to save your document.
- Enter a name for your document in the **File name** field.
- Choose the file format (such as Word Document (*.docx)) from the **Save as type** dropdown.
- Click **Save**.

For documents already saved previously, you can simply click **Save** or press **Ctrl+S** to save changes without opening the dialog box.