

1. Title Slide

- Course: Information Technology for Libraries
- Day 1: Information Technology Fundamentals
- CDOE Distance Education | PCP Session

2. Concept of Information Technology

- Definition: The use of computers, storage, networking, and devices to create, process, store, secure, and exchange electronic data
- Encompasses both hardware and software working together
- Enables automation, communication, and information management

3. Components of IT

- Hardware: Physical devices (CPU, memory, peripherals)
- Software: Programs and applications (system, application)
- Data: Information in digital formats
- People & Processes: Users and workflows utilizing technology

4. Need/Purpose of IT – Part 1

- High-speed processing: Performs millions of calculations per second
- Accurate calculations: Eliminates human computational errors
- Automation: Reduces repetitive manual tasks
- Standardization: Ensures consistent operations

5. Need/Purpose of IT – Part 2

- Efficient storage: Compact digital storage replaces physical space
- Instant retrieval: Find information in seconds, not hours
- Global communication: Connect across distances instantly
- Resource sharing: Multiple users access same resources simultaneously

6. Role of ICT in Libraries – Part 1

- Automation of housekeeping: Circulation, cataloging, serials management
- Digitization: Convert physical collections to digital formats
- OPAC: Online Public Access Catalogue replaces card catalogues
- Barcode/RFID: Fast item identification and tracking

7. Role of ICT in Libraries – Part 2

- Remote access: 24/7 availability of e-resources from anywhere
- Digital libraries: Preserve and provide access to born-digital content
- Networking: Resource sharing through consortia and networks
- User services: Email alerts, SMS reminders, virtual reference

8. Computer Hardware – Concept

- Definition: The physical, tangible components of a computer system
- Components that can be touched and seen
- Includes internal components (CPU, memory) and external devices (peripherals)
- Foundation upon which software operates

9. The CPU – Definition

- CPU: Central Processing Unit
- Known as the "brain" of the computer
- Executes instructions and processes data
- Determines overall system performance and speed

10. CPU Component – ALU

- ALU: Arithmetic Logic Unit
- Performs mathematical operations: addition, subtraction, multiplication, division
- Executes logical operations: AND, OR, NOT, comparisons
- Handles decision-making operations (greater than, less than, equal to)

11. CPU Component – Control Unit

- Control Unit (CU): The traffic controller of the computer
- Directs the flow of data and instructions between components
- Interprets program instructions and coordinates execution
- Does not process data itself—manages the process

12. CPU Component – Registers

- Registers: Ultra-fast temporary storage located inside the CPU
- Holds data being processed immediately
- Fastest memory in the computer system
- Very limited capacity (bytes to kilobytes)

13. CPU – Library Context

- Server CPUs: Library servers require powerful multi-core processors
- OPAC searches: Handle multiple simultaneous user queries
- Database operations: Process complex search and retrieval requests
- ILS performance: Faster CPU means quicker circulation transactions

14. Computer Memory – Concept

- Definition: Storage space for data and instructions
- Primary memory: Directly accessible by CPU (RAM, ROM, Cache)
- Secondary memory: External storage (hard disk, SSD, USB)
- Hierarchy: Faster memory is costlier and smaller in capacity

15. RAM – Definition

- RAM: Random Access Memory
- Volatile memory: Contents lost when power is turned off
- Read/Write memory: Data can be read and modified
- Temporary workspace: Holds active programs and data

16. RAM – Function

- Active programs: Stores programs currently running
- Data processing: Holds data being manipulated by CPU
- Multitasking: More RAM allows more programs to run simultaneously
- Performance: Determines system speed and responsiveness

17. ROM – Definition

- ROM: Read-Only Memory
- Non-volatile: Retains contents without power
- Permanent storage: Contents cannot be easily modified
- Firmware: Contains essential boot instructions (BIOS/UEFI)

18. Cache Memory – Definition

- Cache: Ultra-fast memory located between CPU and RAM
- Purpose: Bridge the speed gap between fast CPU and slower RAM
- Levels: L1 (fastest, smallest), L2, L3 (larger, slower)
- Transparent: Managed automatically by hardware

19. Cache Memory – Function

- Frequently used data: Stores instructions and data accessed repeatedly
- Speed optimization: Reduces CPU wait time for data
- Prediction: Anticipates what CPU will need next
- Performance boost: Can improve processing speed significantly

20. Memory – Library Context

- Server RAM: High RAM needed for Koha/DSpace to handle multiple users
- Database caching: Faster searches in large library databases
- OPAC performance: Quick response to patron search queries
- Digital libraries: Smooth access to high-resolution images and PDFs

21. Computer Peripherals – Concept

- Definition: External devices connected to a computer
- Input devices: Send data to computer (keyboard, mouse, scanner)
- Output devices: Receive data from computer (monitor, printer)
- Storage devices: Both input and output (USB drive, external disk)

22. Input Devices – Keyboard & Mouse

- Keyboard: Primary text input device
- Mouse: Pointing device for graphical interfaces
- Optical/laser technology: For mouse interaction

23. Input Devices – Scanner

- Scanner: Converts physical documents to digital images
- Types: Flatbed, sheet-fed, handheld
- Resolution: Measured in DPI (dots per inch)
- Library use: Digitization of books, photographs, manuscripts

24. Output Devices – Monitor

- Monitor: Visual display unit (VDU)
- Types: LCD, LED, OLED
- Resolution: 720p, 1080p, 4K (higher = sharper image)
- Size: Measured diagonally in inches

25. Output Devices – Printer

- Printer: Produces hard copy output
- Types: Impact (dot matrix) vs. Non-impact (inkjet, laser)
- Inkjet: Affordable, good color, slower
- Laser: Fast, high quality, economical for volume

26. Peripherals – Library Context (Input)

- Barcode scanner: Reads item barcodes for circulation
- RFID reader: Contactless item identification
- Webcam: Video input for virtual reference services
- Document camera: Projects physical documents for instruction

27. Peripherals – Library Context (Output)

- Receipt printer: Prints due date slips for check-outs
- Label printer: Prints spine labels and barcode labels
- Projector: Displays presentations and instruction materials
- Self-checkout kiosk: Combined input/output for patron use

28. Quick Recap – Hour 1

- CPU: ALU + Control Unit + Registers = processing power
- Memory: RAM (temporary), ROM (permanent), Cache (fast)
- Peripherals: Input (keyboard, scanner), Output (monitor, printer)
- Library application: Technology enables efficient services

29. Discussion Question

- Scenario: A librarian scans a book barcode at circulation desk
- Trace the path: Scanner → CPU → Memory → Database → Printer
- Identify: Which components are input, processing, output?

30. Break / Transition

- End of Hour 1
- Next: Software and Operating Systems

31. Computer Software – Concept

- Definition: A set of instructions that tells hardware what to do
- Intangible component of computer system
- Stored as programs and applications
- Without software, hardware is useless

32. System Software

- Definition: Manages hardware and provides platform for applications
- Operating System: Windows, Linux, macOS
- Device Drivers: Interface between OS and hardware
- Utilities: Maintenance and optimization tools

33. Application Software

- Definition: Designed for end-users to perform specific tasks
- Productivity: MS Word, Excel, PowerPoint
- Library-specific: Koha ILS, DSpace, Greenstone
- Media: Browsers, media players, image editors

34. System Software – Examples

- Windows: Microsoft's proprietary OS
- Linux: Open-source Unix-like OS
- macOS: Apple's OS for Mac computers
- Android/iOS: Mobile operating systems

35. Application Software – Examples

- MS Office: Word processing, spreadsheets, presentations
- Koha: Open-source Integrated Library System
- DSpace: Digital repository software
- Greenstone: Digital library software

36. Software – Library Context

- System software: Runs the library server
- Application software: Runs the library services
- ILMS: Application software built on system software
- Customization: Open-source allows library-specific modifications

37. Proprietary Software

- Definition: Commercially licensed, source code hidden
- License: Paid, restrictive terms of use
- Support: Professional vendor support
- Modification: Not allowed or severely restricted

38. Proprietary Software – Examples

- Microsoft Windows: Operating system
- MS Office: Productivity suite
- Adobe Photoshop: Image editing
- Libsys: Commercial library management system

39. Open-Source Software (OSS)

- Definition: Source code freely available to use, modify, distribute
- License: Free, permits modification and redistribution
- Support: Community-driven forums and documentation
- Philosophy: Collaborative development, transparency

40. Open-Source Software – Examples

- Linux: Operating system kernel
- Koha: Integrated Library Management System
- DSpace: Digital repository platform
- LibreOffice: Office productivity suite

41. OSS – Library Context

- Cost advantage: Zero licensing fees for budget-constrained libraries
- Customization: Modify source code for local needs
- Community: Global network of developers and users
- Sustainability: No vendor lock-in, long-term viability

42. Proprietary vs. Open Source

Aspect	Proprietary	Open Source
Cost	Paid license	Free
Source code	Hidden	Open
Support	Vendor	Community
Customization	Limited	Extensive
Examples	MS Windows, Office	Linux, Koha, DSpace

43. Operating System – Definition

- OS: The master software managing all hardware and software
- Resource manager: Allocates CPU, memory, storage, devices
- Interface: Between user and hardware
- Foundation: All other software depends on OS

44. Windows – Features

- GUI-heavy: Graphical User Interface, desktop metaphor
- Proprietary: Commercial, closed-source
- Compatibility: Wide range of software support
- User-friendly: Easy for beginners, extensive documentation

45. Linux – Features

- Open-source: Free, source code available
- Stable: Reliable, fewer crashes
- Secure: Less vulnerable to malware
- Server-preferred: Powers most web servers and ILS

46. Windows – Pros and Cons

- Pros: Easy to use, wide software availability, commercial support
- Cons: Licensing costs, security vulnerabilities, resource-heavy
- Best for: Desktop computers, office environments
- Library use: Staff workstations, administrative computers

47. Linux – Pros and Cons

- Pros: Free, stable, secure, customizable
- Cons: Learning curve, fewer commercial applications, technical support needed
- Best for: Servers, embedded systems, development
- Library use: Koha/DSpace servers, digital library platforms

48. OS – Library Context

- Windows: Staff desktops, public access terminals
- Linux: Library servers hosting ILS and digital repositories
- Cost factor: Linux reduces TCO (Total Cost of Ownership)
- Performance: Linux servers handle high user loads efficiently

49. Windows vs. Linux – Comparison

Feature	Windows	Linux
Cost	Paid	Free
Source	Closed	Open
Ease of use	Beginner-friendly	Learning curve
Security	Vulnerable	More secure
Best for	Desktops	Servers
Support	Microsoft	Community

50. Day 1 Recap – Part 1

- IT components: Hardware, Software, Data, People, Processes
- Hardware: CPU (ALU, CU, Registers), Memory (RAM, ROM, Cache)
- Peripherals: Input (keyboard, scanner), Output (monitor, printer)
- Software: System (OS) vs. Application (Koha, DSpace)

51. Day 1 Recap – Part 2

- IT benefits: Speed, accuracy, storage, communication
- Library ICT: Automation, digitization, remote access, networking
- Software types: Proprietary (paid, closed) vs. Open-source (free, open)
- OS choice: Windows (desktops) vs. Linux (servers)

52. Day 1 Recap – Part 3

- Key decision: Choosing right software for library needs
- Budget considerations: Open-source reduces costs
- Technical capacity: Linux requires skilled administration
- Long-term sustainability: Community vs. vendor support

53. Discussion Question 1

- Question: Why do most digital libraries prefer Linux servers?
- Consider: Cost, stability, security, customization
- Hint: Think about 24/7 availability and budget constraints
- Answer: Free, stable, secure, customizable for specific needs

54. Discussion Question 2

- Question: What are risks of using proprietary software in libraries?
- Consider: Vendor lock-in, licensing costs, discontinuation
- Hint: What happens if vendor goes out of business?
- Answer: High costs, dependency, limited customization options

55. Day 1 Summary

- Core concepts: IT definition, components, purpose
- Hardware: CPU, memory, peripherals and functions
- Software: System vs. Application, Proprietary vs. Open-source
- OS: Windows and Linux features, comparison, library applications

56. Suggested Reading – Unit I

- Rowley, J. (1998). The electronic library. Library Association.
- Chowdappa, N. (2011). Library automation. Ess Ess Publications.
- Library of Congress. (n.d.). MARC standards.

57. Preview – Day 2

- Unit II: Web Technologies and Networking
- Topics: HTML, WWW, browsers, email, WiFi
- Networks: PAN, LAN, MAN, WAN, topologies
- Protocols: HTTP/HTTPS, TCP/IP, DNS, URL, DOI

58. Open Q&A

- Questions from Hour 1 (Hardware)?
- Questions from Hour 2 (Software/OS)?
- Clarifications on any concepts?
- Preview of assignments?

59. Thank You

- End of Day 1
- See you tomorrow for Day 2
- Contact information for queries

60. End of Day 1

- Next session: Web Technologies and Networking
- Preparation: Review CPU, memory, software types
- Assignment: Identify hardware/software in your local library