

1. Title Slide

- Day 2: Web Technologies, Networking & Automation
- Building on IT Fundamentals
- CDOE Distance Education | PCP Session

2. HTML – Concept

- HTML: HyperText Markup Language
- Definition: Standard markup language for creating web pages
- Not programming: A markup language using tags
- Foundation: Every website is built on HTML

3. HTML – Purpose

- Structure: Defines headings, paragraphs, lists, links, images
- Tags: html, head, body, p, a, img tags
- Display: Tells browser how to render content
- Integration: Works with CSS (style) and JavaScript (behavior)

4. HTML – Basic Structure

- DOCTYPE html example with title Library Page
- body h1 Welcome to Library
- p Library information here
- Code example of basic HTML page

5. HTML – Library Context

- Library websites: Built with HTML
- LibGuides: Subject guides use HTML structure
- Digital repositories: Web interface uses HTML
- OPAC: Web-based catalogue uses HTML for display

6. WWW – Concept

- WWW: World Wide Web
- Definition: System of interlinked hypertext documents accessed via Internet
- Inventor: Tim Berners-Lee (1989)
- Protocol: Uses HTTP for communication

7. WWW vs. Internet

- Internet: Physical network infrastructure (hardware)
- WWW: Service running on Internet (software/content)
- Relationship: WWW is a subset of Internet services
- Other services: Email, FTP, VoIP, messaging

8. Web Browser

- Definition: Software application for accessing web pages
- Function: Renders HTML, displays multimedia
- Features: Bookmarks, history, extensions, tabs
- Examples: Chrome, Firefox, Edge, Safari, Opera

9. E-mail – Concept

- E-mail: Electronic mail
- Definition: Digital message exchange system
- Components: Sender, recipient, subject, body, attachments
- Asynchronous: Send now, read later

10. E-mail – Protocols

- SMTP: Simple Mail Transfer Protocol (sending)
- POP3: Post Office Protocol (receiving, downloads to device)
- IMAP: Internet Message Access Protocol (receiving, stays on server)
- Examples: Gmail, Outlook, Yahoo Mail

11. WiFi – Concept

- WiFi: Wireless Fidelity (IEEE 802.11 standard)
- Definition: Wireless networking technology for local area networks
- Technology: Uses radio waves (2.4 GHz, 5 GHz)
- Range: ~30 meters indoors, ~100 meters outdoors

12. WiFi – Library Applications

- WiFi zones: Patrons use laptops/mobile devices
- Hotspots: Internet access without cables
- Security: WPA2, WPA3 encryption
- Benefit: Flexible access anywhere in library

13. Search Engines – Concept

- Definition: Software system that searches the World Wide Web
- Function: Indexes web pages, returns relevant results
- Process: Crawling → Indexing → Ranking
- Examples: Google, Bing, Yahoo, DuckDuckGo

14. Search Engines – Crawling

- Crawling: Automated bots (spiders/crawlers) scan web pages
- Discovery: Follow links from page to page
- Frequency: Regular revisits to check for updates
- Purpose: Find new and updated content

15. Search Engines – Indexing

- Indexing: Analyzing and storing content in databases
- Analysis: Keywords, metadata, page structure
- Storage: Massive databases of web content
- Organization: Categorized for quick retrieval

16. Search Engines – Ranking

- Ranking: Ordering results by relevance
- Algorithms: Complex formulas considering hundreds of factors
- Factors: Keywords, page quality, freshness, authority
- Goal: Most useful results first

17. Search Engine Types

- Crawler-based: Google, Bing (automated indexing)
- Human-powered directories: DMOZ (manual categorization)
- Academic: Google Scholar, PubMed, IEEE Xplore
- Meta-search: Dogpile (searches multiple engines)

18. Search Engines – Library Context

- Discovery: Users find library resources via search engines
- SEO: Search Engine Optimization for library websites
- Information literacy: Teach critical evaluation of results
- Alternative: Library databases vs. general web search

19. Computer Networks – Concept

- Definition: Two or more computers connected to share resources
- Components: Nodes (computers), links (cables/wireless), protocols (rules)
- Purpose: Communication and resource sharing
- Foundation: Modern library operations depend on networks

20. Network Benefits – Part 1

- Resource sharing: Printers, scanners, storage devices
- Cost reduction: Shared hardware and software
- Centralized data: Single database for all users
- Backup: Centralized data protection

21. Network Benefits – Part 2

- Communication: Email, messaging, video conferencing
- Collaboration: Shared documents and projects
- Remote access: Access resources from anywhere
- Scalability: Add users and devices easily

22. PAN – Personal Area Network

- PAN: Personal Area Network
- Range: ~10 meters
- Technology: Bluetooth, USB, NFC
- Examples: Phone to earbuds, laptop to mouse
- Use: Connecting personal devices

23. LAN – Local Area Network

- LAN: Local Area Network
- Range: Building or campus (up to ~1 km)
- Technology: Ethernet (cables), WiFi (wireless)
- Examples: Library network, office network
- Ownership: Single organization

24. MAN – Metropolitan Area Network

- MAN: Metropolitan Area Network
- Range: City or metropolitan area (up to ~50 km)
- Technology: Fiber optics, microwave
- Examples: City-wide WiFi, university campus network
- Ownership: Multiple organizations or ISP

25. WAN – Wide Area Network

- WAN: Wide Area Network
- Range: Country, continent, or global
- Technology: Satellite, fiber, leased lines
- Examples: Internet, bank networks, library consortia
- Ownership: Multiple ISPs, global organizations

26. Network Classification Summary

Type	Range	Example	Technology
PAN	~10m	Bluetooth	Bluetooth, USB
LAN	~1km	Library network	Ethernet, WiFi
MAN	~50km	City WiFi	Fiber, microwave
WAN	Global	Internet	Satellite, fiber

27. Network Topology – Concept

- Topology: Physical or logical arrangement of network nodes
- Determines: Data flow, network efficiency, cost
- Types: Bus, Star, Ring, Mesh
- Affects: Reliability, scalability, maintenance

28. Bus Topology

- Structure: Single central cable (backbone)
- Connection: All nodes connect to backbone
- Advantages: Simple, low cost, easy installation
- Disadvantages: Single point of failure, difficult troubleshooting

29. Star Topology

- Structure: Central hub/switch with nodes radiating outward
- Connection: Each node connects only to central hub
- Advantages: Easy to add nodes, isolated failures
- Disadvantages: Hub failure disables entire network
- Most common: Modern LANs use star topology

30. Break / Transition

- End of Hour 1
- Next: Protocols and Library Automation

31. Protocol – Concept

- Definition: Set of rules governing data communication
- Purpose: Ensures interoperability between different systems
- Standardization: International bodies (IETF, W3C, IEEE)
- Analogy: Language grammar for computers

32. HTTP/HTTPS

- HTTP: HyperText Transfer Protocol
- Function: Transfers web pages between server and browser
- HTTPS: HTTP Secure (encrypted with SSL/TLS)
- Security: HTTPS protects data in transit
- Library use: All library websites should use HTTPS

33. TCP/IP

- TCP/IP: Transmission Control Protocol/Internet Protocol
- TCP: Ensures reliable, ordered data delivery
- IP: Addresses and routes data packets
- Foundation: Core protocol of the Internet
- Layers: Application, Transport, Internet, Network Access

34. DNS

- DNS: Domain Name System
- Function: Translates domain names to IP addresses
- Example: `www.google.com` → `142.250.77.142`
- Hierarchical: Distributed database system
- Importance: User-friendly web browsing

35. URL

- URL: Uniform Resource Locator
- Definition: Web address identifying resource location
- Structure: Protocol + Domain + Path
- Example: <https://library.edu/catalog/book.html>
- Components: Scheme, host, path, query

36. DOI

- DOI: Digital Object Identifier
- Definition: Permanent unique identifier for digital content
- Format: 10.xxxx/xxxxx
- Example: 10.1000/182
- Use: Academic papers, datasets, permanent linking

37. Protocols – Library Context

- HTTP/HTTPS: Access library websites and OPACs
- TCP/IP: Foundation of library networks
- DNS: Resolve library domain names
- DOI: Persistent links to e-journals and datasets

38. Library Automation – Definition

- Definition: Application of computer and networking technologies to library operations
- Scope: Technical and public services
- Goal: Replace manual processes with computerized systems
- Result: Efficient, accurate, user-friendly services

39. Automation – Need

- Growing collections: Manual systems cannot cope
- User expectations: Fast, 24/7 access
- Resource optimization: Do more with less staff
- Accuracy: Eliminate human errors
- Integration: Connect with other systems

40. Automation – Purpose

- Efficiency: Faster operations, reduced workload
- Accuracy: Error-free calculations and records
- Accessibility: Remote access to catalogues
- Cost-effectiveness: Long-term savings
- Enhanced services: OPAC, alerts, reports

41. Automation – Benefits (Operations)

- Speed: Circulation transactions in seconds
- Accuracy: No manual calculation errors
- Tracking: Real-time item location and status
- Reports: Instant statistics and analytics

42. Automation – Benefits (Services)

- OPAC: User-friendly search interface
- Remote access: 24/7 availability
- Self-service: Self-checkout, renewal
- Communication: Email/SMS alerts and reminders

43. Implementation – Turnkey

- Turnkey system: Ready-made package from vendor
- Includes: Hardware, software, installation, training
- Advantages: Quick setup, vendor support
- Disadvantages: High cost, limited customization
- Examples: Libsys, VTLS

44. Implementation – In-house

- In-house development: Library IT team builds custom system
- Advantages: Perfect fit for local needs
- Disadvantages: Expensive, time-consuming, requires expertise
- Best for: Large libraries with strong IT departments
- Risk: Maintenance and updates responsibility

45. Implementation – Open-Source

- Open-source: Adopt free software, customize locally
- Advantages: No license fees, customizable, community support
- Disadvantages: Requires technical skills, self-support
- Examples: Koha, Evergreen
- Best for: Libraries with IT capacity, budget constraints

46. Implementation – Cloud/SaaS

- Cloud/SaaS: Software as a Service, vendor-hosted
- Advantages: No local server, automatic updates, lower upfront cost
- Disadvantages: Subscription fees, internet dependency, data control
- Examples: Librarika, WorldShare Management Services
- Best for: Small libraries without IT infrastructure

47. ILMS – Concept

- ILMS: Integrated Library Management System
- Definition: Single, unified software for all core library functions
- Modules: Acquisition, Cataloging, Circulation, Serials, OPAC
- Integration: Shared database, seamless workflow

48. ILMS – Core Modules

- Acquisition: Ordering, receiving, invoicing
- Cataloging: Creating and maintaining bibliographic records
- Circulation: Check-in/check-out, holds, fines
- Serials: Subscription management, routing
- OPAC: Public interface for searching

49. ILMS – Features

- Centralized database: One record for all functions
- MARC support: Standard bibliographic format
- Z39.50: Copy cataloging from other libraries
- Reports: Statistics, usage analysis
- User management: Patron records, permissions

50. ILMS – Benefits

- Efficiency: Eliminates duplicate data entry
- Accuracy: Consistent information across modules
- Cost savings: Reduced staff time for routine tasks
- User service: Faster, more accurate responses
- Management: Better decision-making with data

51. Libraria – Overview

- Libraria: Cloud-based ILMS
- Type: Free, open-source, web-based
- Target: Small to medium libraries
- Features: Cataloging, circulation, member management
- Access: Any device with Internet

52. Librarika – Key Features

- Cloud-based: No local server required
- Multi-user: Staff and patrons
- Barcode support: Item and member scanning
- Online catalogue: Public access
- Mobile friendly: Responsive design

53. Day 2 Recap – Part 1

- Web tech: HTML, WWW, browsers, email, WiFi
- Search engines: Crawling, indexing, ranking
- Networks: PAN, LAN, MAN, WAN
- Topologies: Bus, Star, Ring, Mesh

54. Day 2 Recap – Part 2

- Protocols: HTTP/HTTPS, TCP/IP, DNS, URL, DOI
- Automation: Definition, need, benefits
- Implementation: Turnkey, In-house, Open-source, Cloud
- ILMS: Concept, modules, features, benefits

55. Day 2 Recap – Part 3

- Librarika: Cloud-based, free, for small libraries
- Key decision: Choose implementation approach wisely
- Budget: Open-source vs. proprietary
- Capacity: In-house skills vs. vendor support

56. Discussion Question 1

- Question: What is the difference between a Network and the Internet?
- Hint: Think about scope and ownership
- Answer: Network = connected devices; Internet = global network of networks

57. Discussion Question 2

- Question: Which automation approach is best for a small rural library?
- Consider: Budget, IT skills, infrastructure
- Answer: Cloud/SaaS (Librarika) or Open-source (Koha) with support

58. Day 2 Summary

- Web technologies: Enable access to information
- Networks: Connect library systems and users
- Protocols: Standard rules for communication
- Automation: Transforms library operations and services

59. Preview – Day 3

- Unit III: ReCON, UNICODE, Digital Libraries
- Unit IV: Library 2.0, Web 3.0, ASNs, Barcodes, QR, Screen Readers
- Focus: Digital tools and accessibility

60. End of Day 2

- Next session: Digital Technologies and Tools
- Preparation: Review protocols and automation approaches
- Assignment: Compare two ILMS options for a library