Multi-disciplinary Course

Information and Communication Technologies (ICT)

Semester-I

MDC-1: Information and Communication Technologies-I

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Chapter-4
Concept of Internet

The Internet is a global network of interconnected computers and devices that communicate with each other using standardized protocols. It enables the exchange of information, access to resources, and communication across vast distances, revolutionizing how individuals, businesses, and governments interact.

Uses of Internet

1. Communication

- **Email:** Quick and efficient exchange of messages globally.
- **Social Media:** Platforms like Facebook, Instagram, and Twitter enable social interaction and networking.
- **Video Calls:** Tools like Zoom and Google Meet facilitate real-time face-to-face communication.

2. Information Access

- **Search Engines:** Websites like Google and Bing provide instant access to vast amounts of knowledge.
- **Online Libraries:** Digital resources offer e-books, journals, and research papers.
- **News:** Real-time updates on global events via news websites and apps.

3. Education

- **E-Learning:** Platforms like Coursera, Khan Academy, and Udemy offer online courses.
- **Virtual Classrooms:** Tools like Microsoft Teams and Google Classroom support remote learning.
- **Research:** Students and professionals can access databases, tutorials, and academic content.

4. Business and Commerce

- **E-Commerce:** Platforms like Amazon and Flipkart enable online shopping and transactions.
- **Digital Marketing:** Businesses promote their products via online ads and social media.

- **Freelancing:** Websites like Upwork and Fiverr connect freelancers with clients.

5. Entertainment

- **Streaming Services:** Platforms like Netflix, YouTube, and Spotify provide movies, music, and videos.
- **Gaming:** Online multiplayer games and virtual reality experiences are popular forms of entertainment.
- **Social Interaction:** Forums and live-streaming apps engage users in interactive content.

6. Banking and Financial Services

- **Online Banking:** Manage accounts, transfer funds, and pay bills through secure websites or apps.
- **Digital Payments:** Tools like PayPal, Google Pay, and UPI enable cashless transactions.
- **Investment Platforms:** Access to stock markets, mutual funds, and cryptocurrency trading.

7. Healthcare

- **Telemedicine:** Online consultations with doctors through platforms like Practo or Teladoc.
- **Health Apps:** Monitoring fitness, scheduling appointments, and accessing medical records.
- **Medical Research:** Sharing knowledge and advancements in healthcare through digital networks.

8. Governance and Administration

- **E-Governance:** Online portals for tax filing, voting, and government services.
- **Public Awareness:** Dissemination of information about public policies and programs.
- **Transparency:** Promoting accountability through accessible government data.

9. Work and Collaboration

- **Remote Work:** Tools like Slack and Microsoft Teams enable team collaboration.
- **Cloud Services:** Access files and applications from anywhere using cloud platforms like Google Drive.
- **Project Management:** Tools like Asana and Trello improve efficiency and coordination.

10. Social Impact

- **Global Connectivity:** Brings people from different cultures closer.
- **Advocacy and Awareness:** Drives social movements and awareness campaigns.
- **Disaster Management:** Facilitates real-time communication and relief coordination.

Connecting to Internet

onnecting to the Internet involves establishing a link between a device (e.g., computer, smartphone) and the global network of interconnected systems. The process requires specific hardware, software, and an Internet Service Provider (ISP).

Steps for Connecting to the Internet:

The following hardware are required to connect to the internet:

1. Device: A computer, smartphone, or tablet.
2. Modem/Router: A modem connects to the ISP, while a router enables wireless or wired connections to devices.
3. Internet Service Provider (ISP): An ISP provides the infrastructure and services for accessing the Internet. Users subscribe to a data plan, which can vary in speed and cost.

Once connected, users can access web services, apps, and platforms through a web browser or other Internet-enabled applications.

ISP

An Internet Service Provider (ISP) is a company or organization that provides individuals and businesses with access to the Internet. ISPs offer a range of services, including data connectivity, email hosting, web hosting, and network management, enabling users to connect their devices to the global Internet infrastructure.

Functions of an ISP:

1. Internet Access: ISPs provide access to the Internet through technologies like fiber optics, DSL, cable, or satellite.
2. Bandwidth Allocation: ISPs manage the speed and data limits based on the user's subscription plan.
3. IP Address Assignment: ISPs assign unique IP addresses to connected devices, enabling communication over the Internet.
4. Hosting Services: Many ISPs offer additional services, such as email accounts, cloud storage, and web hosting.
5. Network Maintenance: ISPs maintain and upgrade the network infrastructure to ensure consistent and reliable Internet connectivity.

Popular ISP Technologies:

1. **DSL (Digital Subscriber Line):** Uses existing telephone lines for Internet.
2. **Cable Internet:** Uses coaxial cable TV lines for faster connectivity.
3. **Fiber Optics:** Provides the fastest speeds by transmitting data through light signals in fiber cables.

4. **Satellite Internet:** Enables Internet access in remote areas via satellite signals.

Basics of internet connectivity

Internet connectivity is the process of linking a device to the global network of interconnected systems, enabling access to online resources and services. It requires hardware components like modems, routers, and network interface cards (NICs) to establish the connection, while software and network protocols like TCP/IP facilitate data transmission. Connectivity can be achieved through wired methods, such as Ethernet, or wireless technologies, including Wi-Fi and mobile data (4G/5G). An Internet Service Provider (ISP) serves as the gateway, offering access to the Internet via technologies like DSL, fiber optics, or satellite. Once connected, devices authenticate through the ISP and use tools like browsers or apps to access websites, emails, and other digital services. Reliable Internet connectivity has become essential for communication, education, business, and entertainment in the digital age.

World Wide Web and Websites

The World Wide Web (www) is a system of interlinked documents and resources accessible via the Internet. It allows users to browse and interact with various types of content, such as text, images, videos, and applications, through a web browser. Developed by Tim Berners-Lee in 1989, the Web uses HTTP (Hypertext Transfer Protocol) to transfer data and URLs (Uniform Resource Locators) to locate resources.

A website is a collection of related web pages hosted on a web server, identified by a unique domain name (e.g., www.example.com). Websites can serve different purposes, such as providing information, facilitating e-commerce, offering entertainment, or supporting social interaction. Websites are designed using HTML, CSS, and other web technologies to create interactive and user-friendly experiences.

Types of Websites

- Informational Websites: Provide knowledge or updates (e.g., news sites).
- E-commerce Websites: Facilitate online shopping and transactions (e.g., Amazon).
- Social Media Platforms: Enable social interaction and content sharing (e.g., Facebook).
- Educational Websites: Offer learning resources and courses (e.g., Coursera).
- Personal or Portfolio Websites: Showcase individual or professional work.

Web Browsing softwares

Web browsing software, commonly known as web browsers, are applications that allow users to access, retrieve, and display content on the World Wide Web. They act as an interface

between users and web servers, enabling the viewing of web pages, multimedia content, and online applications. Some examples are Google Chrome, Mozilla Firefox, Opera etc.

Search Engines

A search engine is a software system designed to help users find information on the Internet by retrieving and ranking web pages based on their relevance to a search query. Search engines use complex algorithms to index, search, and rank vast amounts of online data, making it easier to locate specific content. Some examples are Google, Bing, Yahoo, DuckDuckGo etc.

Searching information in web

Searching for information on the web involves using search engines or specialized websites to find relevant content from the vast resources available online.

Steps for Searching Information

1. Choose a Search Engine: Use popular search engines like Google, Bing, or DuckDuckGo to begin your search.
2. Enter Search Query: Use relevant keywords or phrases related to the information you need. Be specific for better results (e.g., "top economic theories" instead of "economics").
3. Apply Filters: Narrow results by selecting time range, content type (images, videos, news), or region.
4. Evaluate Search Results: Check the credibility of the sources, such as .edu, .gov, or well-known websites. Look for reliable and up-to-date information.
5. Access and Refine: Open the links and assess whether the content matches your requirements. Modify the query if needed for more targeted results.

Understanding URL

A URL (Uniform Resource Locator) is the address used to identify and access resources on the Internet. It serves as the unique identifier for a specific resource, such as a web page, image, or video, on the World Wide Web. A URL helps browsers locate and retrieve the requested content from web servers.

Structure of a URL

A typical URL consists of several components, each serving a specific function:

- **Protocol:** The protocol specifies how the browser should interact with the resource.

Common protocols include HTTP (Hypertext Transfer Protocol) and HTTPS (HTTP Secure).

Example: https://

- **Domain Name:** The domain name is the human-readable address that identifies the website.

  Example: www.example.com

  The domain name is mapped to an IP address through DNS (Domain Name System).

- **Subdomain (Optional):**

  A subdomain is an optional part of the URL that can be used to organize the website's structure.

  Example: blog.example.com (where "blog" is the subdomain).

  Path: The path specifies the location of a specific resource or page within the website.

  Example: /about-us (refers to the "About Us" page on the site).

  This part helps in navigating deeper sections of the website.

- **Query String (Optional):**

  A query string allows the user to pass additional parameters to the server, often used in search results or filtering.

  Example: ?search=ICT&category=education

  The query string starts with a ? and includes parameters separated by &.

- **Fragment (Optional):**

  A fragment, also known as an anchor, links to a specific section within a web page.

  Example: #section2 (directs the browser to a section titled "section2" on the page).

Example of a URL

https://www.example.com/products?category=electronics&id=123#details

Protocol: https

Domain Name: www.example.com

Path: /products

Query String: ?category=electronics&id=123

Fragment: #details

Domain name

A domain name is a human-readable address used to identify a website or resource on the Internet. It serves as an easier-to-remember substitute for an IP address, which is a unique numerical identifier assigned to each device connected to the Internet. Domain names are essential for navigating the World Wide Web and provide a simple way for users to access websites.

Components of a Domain Name

1. **Top-Level Domain (TLD):** The TLD is the last part of the domain name, typically indicating the type or origin of the domain. Common TLDs include:

   .com (commercial organizations)

   .org (nonprofit organizations)

   .gov (government agencies)

   .edu (educational institutions)

   .net (network-related entities)

   Country Code TLDs (e.g., .uk for the United Kingdom, .in for India).

2. **Second-Level Domain (SLD):** The second-level domain is the part of the domain name that directly identifies the organization or resource. It is typically chosen to reflect the name or brand of the website.

   Example: In www.example.com, example is the second-level domain.

3. **Subdomain (Optional):** A subdomain is a prefix to the main domain, used to organize content or create different sections of a website.

Example: blog.example.com (where "blog" is the subdomain of the main domain example.com).

IP Address

An IP address is a unique numerical identifier assigned to each device connected to a computer network, including the Internet. It allows devices to locate and communicate with each other over the network. IP addresses are a critical component of the Internet's addressing system and play an essential role in routing data to the correct destination.

Types of IP Addresses

1. IPv4 (Internet Protocol version 4):
   - The most commonly used IP address format, consisting of four sets of numbers separated by periods (e.g., 192.168.0.1).
   - Each set of numbers ranges from 0 to 255, allowing for about 4.3 billion unique addresses.
   - Due to the rapid growth of the Internet, IPv4 addresses are running out.
2. IPv6 (Internet Protocol version 6):
   - The newer version of the IP address, designed to replace IPv4.
   - It uses 128-bit addresses, allowing for an almost unlimited number of unique IP addresses (e.g., 2001:0db8:85a3:0000:0000:8a2e:0370:7334).
   - IPv6 adoption is increasing as IPv4 addresses become scarce.

Structure of an IP Address

IPv4 Example: 192.168.1.1

Divided into four octets (8-bit groups), each ranging from 0 to 255.

IPv6 Example: 2001:0db8:85a3:0000:0000:8a2e:0370:7334

Made up of eight groups of four hexadecimal digits.

Public vs. Private IP Addresses:

Public IP Address:

- A unique address used to identify a device or network on the Internet.
- Assigned by an ISP (Internet Service Provider).
- Public IPs are routable over the Internet.

Private IP Address:

- Used within a local network (like a home or office network).
- Not routable on the Internet.
- Reserved IP address ranges (e.g., 192.168.x.x, 10.x.x.x, 172.16.x.x).

Importance of IP Addresses

- Device Identification: Every device on a network must have a unique IP address to communicate with others.
- Routing and Network Management: IP addresses allow data packets to be routed across networks and the Internet to the correct destination.

- Security: Monitoring IP addresses can help identify malicious activities or unauthorized access attempts to a network.
- Location Tracking: IP addresses can sometimes be used to estimate the geographic location of a device, though this is not always accurate.

Basics of electronic mail

Electronic mail (email) is a method of exchanging digital messages between people using electronic devices, typically over the Internet. Email has become one of the most widely used forms of communication for personal, educational, and business purposes.

Components of an Email:

- Subject: The subject line briefly describes the content or purpose of the email.
- Body: The main content of the email, where the message is written. It can contain text, images, links, or other media.
- Attachments: Files (e.g., documents, images, videos) that are attached to the email for the recipient to download or view.
- Sender and Recipient Information:
- From: The email address of the sender.
- To: The email address of the primary recipient.
- CC (Carbon Copy): Additional recipients who receive a copy of the message.
- BCC (Blind Carbon Copy): Recipients who receive the email without others knowing they were included.

Advantages of Email:

- Instant Communication: Email allows messages to be sent and received in seconds, making it faster than traditional mail.
- Cost-Effective: Sending emails is generally free, and it eliminates the need for postage or courier services.
- Global Reach: Emails can be sent and received anywhere in the world with an Internet connection.
- Attachment Support: Files can be sent along with the message, providing a versatile method for sharing documents, images, and other media.

Disadvantages of Email:

- Spam: Unsolicited and often irrelevant emails can clutter inboxes, requiring spam filters.
- Security Risks: Emails can be intercepted or spoofed, making them vulnerable to phishing attacks and malware.
- Overload: Managing large volumes of email can become overwhelming, especially for businesses or high-traffic accounts.

Email account

An email account is a service provided by an email service provider that allows individuals or organizations to send, receive, and manage email messages. It is essential for using electronic mail and involves registering with an email service provider, obtaining a unique email address, and accessing email through various platforms or devices.

Key Components of an Email Account:

- Email Address: An email account is identified by a unique email address. The structure of an email address is typically: username@domain.com
- Username: The user's unique identifier (e.g., john.doe).
- Domain: The organization or provider offering the email service (e.g., gmail.com, yahoo.com).
- Email Service Provider: This is the company or platform that offers the email service. Some popular email providers include: Gmail (Google), Outlook (Microsoft), Yahoo Mail etc.
- Inbox: The inbox is where incoming emails are stored and can be accessed by the account owner. It's the primary area for managing received messages.
- Outbox: The outbox temporarily stores outgoing messages that have not yet been sent. After the message is sent, it moves to the "Sent" folder.
- Sent Folder: This folder stores all emails that have been successfully sent from the account. It serves as a record of all outbound communication.
- Spam/Junk Folder: This folder stores emails that are suspected to be spam (unsolicited or unwanted messages). It's important to review and delete these regularly.
- Draft Folder: The draft folder saves emails that are in progress or unfinished. These emails are stored until the user is ready to send them.
- Trash/Deleted Items: This folder temporarily holds deleted emails before they are permanently removed. It allows users to recover emails they may have accidentally deleted.

Types of Email Accounts:

- Personal Email Accounts.
- Business/Professional Email Accounts.
- Temporary/Disposable Email Accounts.
- Educational Email Accounts.

Sending and receiving emails

Sending an Email:

- Open Email Client: Open your email application or web-based email service (e.g., Gmail, Outlook, Yahoo Mail).
- Click on "Compose" or "New Email": This opens a new email window where you can write your message.
- Enter the Recipient's Email Address: In the “To” field, type the email address of the person you want to send the email to. You can also add others in the CC (Carbon Copy) or BCC (Blind Carbon Copy) fields, if needed.
- Add a Subject: The subject line is a brief description of the email’s content, helping the recipient understand the topic of the email.
- Write the Message: In the body of the email, write your message. You can also format the text, add bullet points, or include links.
- Attach Files (Optional): If you need to send attachments, click the "Attach" button (usually represented by a paperclip icon) and select the files from your device.
- Click "Send": Once the email is ready, click on the “Send” button. The email will be transmitted through your email service provider’s SMTP (Simple Mail Transfer Protocol) server and delivered to the recipient's email inbox.

Receiving an Email:

- Check Your Inbox: Open your email client or webmail service and go to the "Inbox." This is where you’ll receive incoming messages.
- Notification: Most email services notify you when you have a new email. These notifications appear on your screen or through your device’s email app.
- Open the Email: Click on the email subject to open and read the content. You can view the body of the email and any attachments included.
- Reply or Forward: After reading an email, you can:
- Reply: Respond directly to the sender using the “Reply” or “Reply All” buttons.
- Forward: Send the email to someone else by clicking the “Forward” button.
- Manage Emails: You can delete, archive, or move emails to folders for better organization. Many email services also offer a spam/junk folder to filter out unwanted emails.

Accessing sent emails

Accessing sent emails allows you to review, resend, or refer back to the messages you've previously sent.

Steps to Access Sent Emails:

- **Open Your Email Client:** Open your email application (e.g., Gmail, Outlook, Yahoo Mail) either via a web browser or a mobile/email client.
- **Go to the Sent Folder:** Most email clients have a "Sent" folder where all sent messages are stored. It is usually located in the sidebar or menu along with other folders like Inbox,

Drafts, Spam, etc. Webmail Services (e.g., Gmail, Outlook) will display this folder on the left side of the screen. Desktop Clients (e.g., Outlook, Apple Mail) will also have a similar "Sent" or "Sent Items" folder in their folder list.

- **View Sent Emails:** Click on the "Sent" folder to see all emails you've sent. The emails are usually organized by the date they were sent. You can browse through the list of sent messages to locate the one you want to review.
- **Open an Email:** To view a specific sent email, click on the subject line or the email itself. This will open the full content of the email, allowing you to read the body, view attachments, and see the recipients.
- **Search for Specific Sent Emails:** If you need to find a particular sent email, use the search bar at the top of your email client. You can search by keywords, subject line, recipient, or even attachments. Most email services also offer advanced search options, allowing you to filter by date or other criteria.
- **Resend or Forward an Email:** If you need to resend or forward an email, open it from the Sent folder, and you can use the "Forward" or "Resend" options, usually located at the top of the email.
- **Managing Sent Emails:** You can delete, archive, or move sent emails to other folders for better organization.

Email attachment

An email attachment is a file or document that is sent along with an email message. Attachments allow users to share various types of content, such as images, documents, spreadsheets, presentations, and more, directly via email.

How to Add and Send an Email Attachment:

- Compose a New Email.
- Click on the Attachment Icon.
- Select the File(s) to Attach.
- Wait for Upload.
- Send the Email.

Types of Files You Can Attach:

- Documents: Word files (.doc, .docx), PDFs (.pdf), spreadsheets (.xls, .xlsx), presentations (.ppt, .pptx).
- Images: JPEG (.jpg), PNG (.png), GIF (.gif), BMP (.bmp).
- Audio Files: MP3 (.mp3), WAV (.wav), AAC (.aac).
- Videos: MP4 (.mp4), AVI (.avi), MOV (.mov).
- Compressed Files: ZIP (.zip), RAR (.rar) – for multiple files or large file sizes.

Security Considerations:

- Scan for Viruses: Always scan email attachments for viruses or malware before opening them, especially from unknown senders.
- File Type Caution: Avoid downloading attachments with executable file extensions (.exe, .bat, .js) unless you trust the sender, as these can be harmful.
