SKILL COURSE
SEMESTER-III
INFORMATION AND COMMUNICATION TECHNOLOGY

SYLLABUS:

UNIT-I: (08 hrs)

Fundamentals of Internet: What is Internet?, Internet applications, Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser – Types of Browsers,I ntroduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, flickr, Skype, yahoo, YouTube, WhatsApp .

Internet

Internet:

The internet is a global network of interconnected computers and servers that communicate with each other using standardized protocols. It allows for the exchange of information, services, and resources among billions of devices.

Applications of Internet:

1. Communication:

The internet has made communication faster and cheaper. Email lets us send messages quickly, and apps like Skype allow video calls. Messaging apps like WhatsApp and social media platforms like Facebook help us stay connected easily. Now, people can talk to each other anywhere in the world without high costs.

2. Web Browsing:

Web browsing is a popular use of the internet. A web browser is a program that lets users access information on the World Wide Web (WWW). There are several web browsers available today, including:

- Google Chrome, Firefox, Safari, Internet Explorer,Opera,Microsoft Edge,Netscape

3. Online Shopping and online banking:

The internet has changed shopping by introducing online stores that are open 24/7. These stores provide all the product details on their websites, allowing customers to easily choose what they need. Online banking is offered by all banks through internet banking, mobile apps like phone pay, google pay over 24*7.

4. Real-Time Update :

The internet makes things easier. One can quickly get an update on the things happening in real-time in any part of the world. For example, sports, politics, business, finance, etc. The internet is very useful in many decisions based on real-time updates.

5. Social Media:
Today's youth spend most of their free time on social media, thanks to the internet. Social media allows users to talk to friends, family, and others. It's also a platform for promoting businesses. People can share their thoughts, pictures, and videos with their friends too.

6. Job Search:
The internet has transformed the job market, making it easier for people to find and apply for their dream jobs. Companies also post job openings online and hire candidates based on their skills. Some popular job search platforms include:

- LinkedIn ,Monster.com, Naukri.com, Indeed, Glassdoor,Upwork

7. Education:
The internet plays an important role in education by being a useful tool for teaching and learning. Teachers can upload notes and videos online, making it easier for students to access information. This has made learning more varied and enjoyable.

8. Travel and Tourism:
Users can easily find their favorite tourist spots around the world and plan their trips online. They can book holiday packages, cabs, hotels, flight tickets, and more using the internet. Some websites that offer these services include:

- goibibo.com
- makemytrip.com
- olacabs.com

9. Stock Market Update:
A stock market update gives the latest news and information about financial markets, focusing on the stock market, where people buy and sell shares of public companies. These updates include key details like current stock prices, individual stock values, trading volumes, market capitalization, and price changes.

10. Video Conferencing
Video conferencing allows people in different locations to have face-to-face meetings using computers. It provides a video link, so you can see and talk to others instead of just using a phone. This method of communication is popular among businesses, homes, and various organizations.

Internet Addressing – Entering a Web Site Address

To enter a website address, or URL, in a web browser, you can do the following:

1. Open your web browser
2. Click the address bar at the top of the screen
3. Type the full URL of the website you want to visit
4. Press Enter on your keyboard

Here are some tips for entering a website address:

- **Type the full address:** Make sure to include "http://" or "https://" if needed.
- **Be careful with spelling:** Misspelling the address or leaving out "www" or ".com" could lead to an error message or the wrong website.
- **Use the address bar as a search engine:** You can type keywords instead of a URL to search for a website.
- **Bookmark frequently visited websites:** This makes them easier to access later.

URL and Components of a URL:
A URL, or Uniform Resource Locator, is a web address used to locate a specific resource on the internet. A URL typically consists of several components, which work together to identify the resource and its location. These components include:
Examples:

https://www.example.com/category-A/subcategory-A1/model-123.html

Protocol: The beginning of the URL, indicating the communication protocol used to access the resource (e.g., HTTP or HTTPS). FTP (for files) and Mailto (for mails) are examples of other types of schemes.

In the example URL above, *https://* is the URL's secure protocol.

Domain Name: The domain or hostname of a URL is a user-friendly expression of the Internet Protocol (IP) address of a website.
In the example above, the domain is *www.example.com*.

Path: Identifies the specific resource or directory on the website.

In our example URL, */category-A/subcategory-A1/model-123.html* shows the path of the URL, which in this example, ends in a product page.

Searching the Internet

Searching the internet involves using search engines, such as Google, Bing, or Yahoo, to find information, websites, or online content. Here are some tips to improve your internet search skills:

1. Use specific keywords: Enter precise terms related to your search query.

2. Use quotes: Search for exact phrases by enclosing them in quotes.

3. Use operators: Utilize operators like AND, OR, and NOT to refine your search.

4. Use site search: Search within a specific website using the "site:" operator.

5. Use file type search: Search for specific file types using the "filetype:" operator.

6. Check spelling: Ensure your keywords are spelled correctly.

7. Use advanced search: Utilize advanced search features like date range, location, and more.

8. Evaluate results: Assess the credibility and relevance of search results.

9. Use multiple search engines: Try different search engines to get diverse results.

10. Stay up-to-date: Regularly update your search skills to adapt to changing search engine algorithms.

Some popular search engines include:

- Google, - Bing,- Yahoo, - DuckDuckGo,- StartPage,- Brave Search

Browser –Types of Browsers:

Web Browser:

A browser, also known as a web browser or internet browser, is a software application used to access and navigate the internet. It allows users to view, search, and interact with websites, web pages, and online content.

Here are the main types of browsers:

1. **Desktop browsers:** Installed on computers, these browsers offer a wide range of features and extensions.

Examples include:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Safari
- Opera

2. Mobile browsers: Designed for smartphones and tablets, these browsers are optimized for smaller screens and touch input.

Examples include:

- Google Chrome (mobile)

- Safari (mobile)

- Samsung Internet

- Firefox (mobile)

3. Web app browsers: Used for accessing web applications, these browsers provide a dedicated environment for web apps.

Examples include:

- Facebook Messenger

- Twitter

- Gmail

4. Text-based browsers: Use text commands to navigate and interact with websites. Examples include:

- Lynx

- Links

5. Privacy-focused browsers: Emphasize user privacy and security, often blocking trackers and ads. Examples include:

- Tor Browser

- Brave

- DuckDuckGo Privacy Browser

6. Specialized browsers: Cater to specific needs, such as:

- Gaming browsers (e.g., Razer Browser)

- Cryptocurrency-focused browsers (e.g., CryptoTab)

7. Legacy browsers: Older browsers no longer supported or updated, such as:

- Internet Explorer

- Netscape Navigator

When choosing a browser, consider factors such as:

- Speed and performance - Security and privacy features- Cross-platform availability

Introduction to Social Networking

Twitter:

Twitter is a social media platform that allows users to post and interact with short messages called "tweets." Each tweet can contain text, images, videos, or links, and is limited to 280 characters. Users can follow other accounts to see their tweets in their feed and can engage with posts by liking, retweeting, or replying.

Launched in 2006, Twitter has become a popular tool for real-time news sharing, public discussions, and networking. It is widely used by individuals, businesses, and public figures to communicate and connect with their audiences. Hashtags are commonly used on Twitter to categorize tweets and make them easier to find. The platform is also known for its role in social movements, trends, and global conversations.

Tumblr:

Tumblr is a social networking and microblogging platform where users can share short-form blog posts, images, videos, and other content. Founded in 2007, Tumblr has gained popularity among younger generations, particularly teenagers and young adults. The platform allows users to customize their blogs with various themes, layouts, and widgets.

Tumblr is known for its vast array of fandom communities, art, and creative content. Today, Tumblr remains a popular platform, with over 320 million active users worldwide.

LinkedIn:

LinkedIn is a professional social networking platform designed for individuals to connect with others and advance their careers. Founded in 2002, it has grown to become one of the largest online platforms for networking, job searching, and professional development. Users can create profiles showcasing their work experience, skills, and education, and engage with others through groups, discussions, and requests for connections. Additionally, LinkedIn offers job search and recruitment services, online courses, and content sharing features to help professionals stay up-to-date with industry news and trends.

Facebook:

Facebook is a social networking platform founded in 2004 by Mark Zuckerberg, along with his college roommates. It allows users to create profiles, connect with friends, family, and colleagues, and share content, including photos, videos, and updates. With over 2.7 billion monthly active users, Facebook is one of the most widely used social media platforms globally. It also offers a range of features, such as groups, marketplace, and messaging, making it a

powerful tool for communication and networking. Additionally, Facebook owns other popular platforms like Instagram and WhatsApp, expanding its reach and capabilities.

Flickr:

Flickr is a popular image and video-sharing platform founded in 2004. With over 320 million registered users, it allows individuals to share and discover photos, videos, and other media. Users can create and manage their own albums, set permissions, and add descriptions and tags to their shared files. Flickr is also known for its community features, allowing users to comment, like, and favorite content. The platform has partnered with various organizations to host collaborative projects and archives, making it a valuable resource for artists, photographers, and researchers alike.

Skype:

Skype is a popular communication platform developed by Microsoft. It provides a range of services, including VoIP (voice over internet protocol) phone calls, video conferencing, instant messaging, and file transfer. Skype allows users to create a free video conference with up to 25 people, making it a convenient tool for businesses, teams, and individuals to connect with each other remotely. Skype is available on various devices, including desktop computers, laptops, mobile phones, and tablets. It is widely used for both personal and professional purposes, enabling seamless communication across geographical distances.

yahoo:

Social networking on Yahoo refers to the online platforms and services offered by the American technology company Yahoo!. Yahoo offers various social media and social networking features, including email, messaging, and social news aggregation.

 Yahoo 360°: Launched in 2005, Yahoo 360° was a social networking and blogging platform that allowed users to create personal profiles, share content, and connect with friends. It featured blogs, photo sharing, and user-generated content but was discontinued in 2009.

 Yahoo Groups: This service allowed users to create and join groups based on shared interests, facilitating discussions, file sharing, and email communication among members. Yahoo Groups was popular for various hobbies, support groups, and community interests but was shut down in December 2020.

 Yahoo Messenger: A messaging service that enabled users to chat with friends and family in real time. Yahoo Messenger offered features like video calls, file sharing, and group chats, but it was discontinued in 2018.

YouTube:

YouTube is a popular video-sharing platform owned by Google. Founded in 2005, it allows users to upload, share, and view videos. With over 2 billion monthly active users, YouTube is the second-most used search engine in the world. The platform features a vast array of content, including music videos, educational tutorials, vlogs, and live streams. YouTube videos can be commented on, liked, and shared, making it a social media platform as well. Additionally, creators can monetize their content through ads, sponsorships, and merchandise sales.

Watsapp:

Watsapp is a popular messaging app owned by Meta, ApiResponse, Inc., and Meta Platforms, Inc. It allows users to send and receive messages, make voice and video calls, and share media with individuals or groups. Watsapp was founded in 2009 by Brian Acton and Jan Koum and was initially acquired by Facebook in 2014. Today, Watsapp has over 2 billion active users worldwide, making it one of the most widely used messaging apps globally.

ICT - UNIT-II:(08 hrs)

Syllabus: E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management. G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

E-Mail:

- E-mail (Electronic Mail) is a method of exchanging digital messages over the internet.
- It allows users to send and receive messages, files, documents, images, and other types of data.
- E-mails can be sent from one person to another or from a business to a customer, and they have become an essential mode of communication in both personal and professional settings.

Advantages of E-mail:

1. **Speed**: E-mails are delivered almost instantly to recipients anywhere in the world.
2. **Cost-effective**: Sending an e-mail is often free, making it a cheaper alternative to postal mail or phone calls.
3. **Convenience**: E-mails can be sent and accessed from multiple devices (smartphones, computers, tablets) at any time.
4. **Attachment capability**: Files, documents, and multimedia can be attached to e-mails and shared with others.
5. **Record-keeping**: E-mails provide a written record of communication that can be stored for future reference.
6. **Mass Communication**: Multiple recipients can receive the same message at once using CC (carbon copy) or BCC (blind carbon copy) features.
7. **Global Reach**: E-mail can be used to communicate with anyone, anywhere in the world, as long as they have internet access.
8. **Environmentally friendly**: E-mails reduce the need for paper and physical mail, contributing to environmental sustainability.

Disadvantages of E-mail:

1. **Security risks**: E-mails are vulnerable to hacking, phishing, and other cyberattacks. Sensitive information can be compromised.
2. **Spam**: Unwanted or junk e-mails, also known as spam, can clutter inboxes and reduce productivity.
3. **Miscommunication**: E-mails may sometimes lack tone or context, leading to misunderstandings between sender and recipient.
4. **Overload**: With the volume of e-mails increasing daily, managing and sorting through e-mails can become overwhelming.
5. **Dependence on the internet**: Without internet access, it is impossible to send or receive e-mails.
6. **Delay in response**: Unlike phone calls, there is no guarantee of immediate feedback in e-mail communication.
7. **Impersonal communication**: E-mails lack the personal touch and non-verbal cues present in face-to-face communication.

User Id's and Password:

User ID (Username):
A unique identifier assigned to an individual to access an e-mail service or system. It is often a combination of letters, numbers, or characters, and helps the system recognize the user.
Examples:

johndoe@gmail.com, lakshmi001@gmail.com

Password:
A secret key associated with a user ID, used to authenticate and ensure only authorized individuals can access an e-mail account. A strong password typically includes a combination of uppercase and lowercase letters, numbers, and special characters to increase security.
Examples: Arun@1998, Satvek_2018

Strong E-mail Password Policy:

- **Length**: At least 12 characters.
- **Character Mix**: Include uppercase, lowercase, numbers, and special characters.
- **Avoid Common Info**: No easy words, personal details, or patterns.
- **Unique**: Use a different password for each account.
- **Update**: Change password every 6-12 months.
- **Enable 2FA**: Add two-factor authentication for extra security.

e-mail addresses

- An **e-mail address** is a unique identifier for an electronic mailbox that users use to send and receive e-mails.
- It usually follows the format:

  username@domain.com.

  - **Username**: The portion before the "@" symbol, identifying the user within a domain.
  - **Domain**: The portion after the "@" symbol, indicating the server or provider handling the e-mail service (e.g., Gmail, Yahoo, Outlook).
- **Example:**

  lakhsmikoneti @gmail.com
- " lakhsmikoneti " is the username.
- "gmail.com" is the domain indicating the e-mail provider (Google's Gmail service).

Domain Names

- A **domain name** is a unique address used to identify websites on the internet.

A domain name is composed of two main parts:

Example of DNS Hierarchy:

"mail.example.com":

- Root (.): The top-most level.
- TLD (.com): The Top-Level Domain for commercial entities.
- Second-Level Domain (example): Represents the organization or entity.
- Subdomain (mail): A specific service or part of the domain (e.g., email).

Mailers

- **Mailers** (or **e-mail clients**) are software applications used to send, receive, and manage e-mails.

They can be web-based, desktop, or mobile applications.

- Types of Mailers:
- **Web-based Mailers**: Accessed through a browser (e.g., Gmail, Yahoo! Mail, Outlook.com).
- **Desktop Mailers**: Installed on computers (e.g., Microsoft Outlook, Mozilla Thunderbird).
- **Mobile Mailers**: E-mail apps for smartphones (e.g., Gmail app, Apple Mail, Outlook app).

These mailers help users manage multiple e-mail accounts, organize messages, and use features like filters, folders, and automated responses.

Email Message Components

An email message consists of several key components that help in delivering and organizing communication effectively.

- **Sender**: The person or entity sending the email.
- **Recipient**: The person or group receiving the email (in the "To" field).
- **CC**: Additional recipients, visible to everyone.
- **BCC**: Hidden recipients whose addresses are not shown to others.
- **Subject**: A brief title summarizing the email's purpose.
- **Body**: The main content of the email, which includes the message.
- **Attachments**: Files (documents, images) included in the email.
- **Signature**: Contact details or predefined text at the end of the email.
- **Date/Time**: Automatically generated when the email is sent.

These components ensure clear and organized email communication.

Message Composition

When composing an e-mail, it's essential to follow a clear and effective structure to convey your message properly. Here are the key components:

- **Subject Line**: Short, clear description of the email's purpose.
- **Greeting**: Polite opening (e.g., "Dear [Name]," or "Hello [Team],").
- **Opening Sentence**: Brief introduction to the message's purpose.
- **Body**: Main content, organized with short paragraphs or bullet points.
- **Call to Action**: Clear instructions if any action is needed (e.g., "Please reply by Friday").
- **Closing Remarks**: Polite conclusion (e.g., "Thank you," or "Looking forward to your response").
- **Sign-Off**: Appropriate closing (e.g., "Best regards," "Sincerely").
- **Signature**: Your name and contact information.

Examples:

- **Subject**: Meeting Reminder for Project Review
  Dear Team,
  I hope you're all doing well. This is a reminder about our project review meeting scheduled for **Friday, October 6th at 10:00 AM**.
  Please make sure to review the project progress document attached and come prepared with any updates or concerns. The agenda includes:
- Progress review
- Upcoming tasks
- Addressing any blockers
  Kindly confirm your attendance by tomorrow.
  Thank you for your attention to this.
  Best regards,
  John Smith
  Project Manager, ABC Corp
  john.smith@abccorp.com
  (123) 456-7890

Mail Management

Mail management refers to the process of organizing, prioritizing, and handling emails effectively to maintain a productive and clutter-free inbox. It helps in managing communication efficiently, saving time, and staying organized.

- **Organizing Emails**: Use folders, labels, and filters to categorize and sort messages.
- **Prioritizing**: Mark important emails with stars/flags and use a priority inbox.
- **Email Overload**: Unsubscribe from unnecessary lists and process emails in batches.
- **Email Tools**: Use search, labels, and rules to automate and find emails easily.
- **Inbox Zero**: Regularly clear your inbox by responding, filing, or deleting.
- **Automated Responses**: Set up autoresponders for common queries or out-of-office messages.
- **Email Scheduling**: Schedule emails to send at specific times.
- **Backup & Security**: Regularly back up important emails and use strong security measures.

Efficient mail management helps reduce clutter and increases productivity.

G-Suite:

G Suite, now rebranded as **Google Workspace**, is a cloud-based suite of productivity and collaboration tools developed by Google. It includes various applications designed for both individual users and businesses to enhance productivity, communication, and collaboration.

Core Applications:

- Gmail , Google Drive,Google Docs, Google Sheets,Google Slides,Google Forms,

Google Drive:

Google Drive is a cloud storage service that allows users to store, share, and collaborate on files online. It integrates with other Google services and can be accessed from any device.

Key Features:

- **Free Storage**: 15 GB of storage shared across Google Drive, Gmail, and Photos.
- **File Types**: Supports documents, images, videos, and more.
- **Sharing & Permissions**: Share files via links or e-mails with customizable access (view, comment, edit).
- **Real-time Collaboration**: Multiple users can work on files (Docs, Sheets, Slides) simultaneously.
- **Device Syncing**: Access files across devices and sync for offline use with the Google Drive app.
- **Version History**: Restore previous versions of files.

Benefits:

- **Easy Access**: Files are available anywhere with internet.
- **Seamless Integration**: Works with Google Docs, Gmail, and other services.
- **Collaboration**: Ideal for team projects with real-time updates.

Google Docs :

Google Docs is a cloud-based word processing application for creating and collaborating on documents.

Key Features:

1. **Real-Time Collaboration**: Multiple users can edit simultaneously.
2. **Formatting Options**: Extensive text formatting and styling tools.
3. **Templates**: Pre-designed templates for various document types.
4. **Commenting and Suggestions**: Facilitate feedback through comments and suggested edits.
5. **Version History**: Track and revert to previous document versions.
6. **Accessibility**: Use from any device with internet access.
7. **Offline Editing**: Edit documents offline with automatic syncing later.
8. **Integration**: Works seamlessly with Google Drive and other Workspace apps.

Benefits:

- **Free to Use**: Accessible with a Google account.
- **User-Friendly**: Easy interface for all skill levels.
- **Enhanced Collaboration**: Ideal for teamwork.

Google Sheets:

Google Sheets is a cloud-based spreadsheet tool for creating, editing, and collaborating on spreadsheets.

Key Features:

- **Real-time Collaboration**: Multiple users can edit the same spreadsheet simultaneously.
- **Formulas & Functions**: Supports common formulas like SUM, AVERAGE, VLOOKUP for calculations.
- **Sharing & Permissions**: Share with others and control access (view, comment, edit).
- **Charts & Graphs**: Create visual data representations (bar charts, pie charts, etc.).
- **Integration**: Works seamlessly with Google Docs, Forms, and other Google services.
- **Data Import/Export**: Import from Excel/CSV and export to multiple formats.
- **Auto-Save & Version History**: Automatically saves changes and tracks document history.
- **Conditional Formatting**: Format cells based on specific rules (e.g., color-code values).
- **Offline Access**: Work offline, sync changes when back online.

Benefits:

- **Accessibility**: Access from any device, no software required.
- **Collaboration**: Ideal for teamwork with real-time updates.
- **Free to Use**: Available with a Google account, paid options for more features.

Google Slides:

Google Slides is a cloud-based presentation tool for creating and collaborating on slide presentations.

Key Features:

- **Real-time Collaboration**: Multiple users can edit the same presentation simultaneously.
- **Templates and Themes**: Offers a variety of pre-designed templates for easy customization.
- **Multimedia Integration**: Insert images, videos, and audio directly into slides.
- **Animations and Transitions**: Add animations to elements and transitions between slides.
- **Speaker Notes**: Include notes for the presenter, visible only during presentations.
- **Version History**: Track changes and restore previous versions.
- **Offline Access**: Create and edit presentations without internet; changes sync later.
- **Sharing & Permissions**: Share presentations with different access levels (view, comment, edit).

Benefits:

- **Accessibility**: Available from any device with internet access.
- **Collaboration**: Ideal for teamwork with real-time updates.
- **Free to Use**: Accessible with a Google account.
- Google Slides is effective for creating engaging presentations for business, education, and personal use.

Google Forms:

Google Forms is a free, cloud-based tool for creating surveys, quizzes, and forms for collecting data.

Key Features:

- **Easy Form Creation**: Simple drag-and-drop interface for building forms.
- **Question Types**: Multiple-choice, short answer, checkboxes, file uploads, rating scales, and more.
- **Custom Themes**: Customize forms with colors, images, and fonts.
- **Real-time Collaboration**: Multiple users can edit forms simultaneously.
- **Response Collection**: Responses are automatically stored and can be viewed in Google Sheets.
- **Quizzes**: Create quizzes with auto-grading and feedback.
- **Data Validation**: Ensure correct input with validation rules (e.g., required fields).
- **Sharing**: Share forms via links, email, or embed them on websites.

Benefits:

- **Free and Easy to Use**: Accessible to anyone with a Google account.
- **Real-time Collaboration**: Ideal for group projects.
- **Efficient Data Collection**: Automated organization and analysis of responses.
- Google Forms is ideal for surveys, quizzes, feedback collection, and event registrations.

UNIT-III:(10 hrs)

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues. What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, eacharya, e-Yantra and NPTEL).

Internet Security Overview

Internet security involves protecting data, information, and devices from online threats, unauthorized access, and cyberattacks. It ensures safe communication, data transfer, and online activities.

Common Threats

1. **Malware**: Includes viruses, ransomware, and spyware that disrupt systems.
2. **Phishing**: Deceptive emails or websites trick users into revealing sensitive information.
3. **Ransomware**: Encrypts user data and demands payment for its release.
4. **DDoS Attacks**: Overloads websites with traffic, causing downtime.

Security Measures

1. **Encryption**: Secures data in transit (e.g., HTTPS).
2. **Firewalls**: Controls network traffic to block unauthorized access.
3. **Antivirus Software**: Detects and removes malware.
4. **Two-Factor Authentication (2FA)**: Adds an extra layer of security.

Best Practices

- **Use Strong Passwords**: Avoid easily guessable passwords.
- **Keep Software Updated**: Patches vulnerabilities.
- **Be Wary of Suspicious Links**: Avoid phishing scams.
- **Enable 2FA**: Adds a security layer beyond passwords.
- **Backup Data**: Protects against data loss in case of attacks.

E-mail threats and secure E-mail

Email is one of the most widely used communication tools, but it also presents significant security risks. Understanding email threats and how to secure email communications is crucial for both individuals and organizations.

Common Email Threats

1. **Phishing**: Fake emails tricking users into revealing sensitive information.
2. **Spear Phishing**: Targeted phishing using personalized details.
3. **Malware/Ransomware**: Malicious attachments or links that infect devices.
4. **Spam**: Unwanted emails, often containing malicious links.
5. **Email Spoofing**: Manipulating email headers to appear as a trusted source.
6. **Whaling**: Targeted phishing at high-profile individuals.

Best Practices for Secure Email

1. **Strong, Unique Passwords** and **Two-Factor Authentication (2FA)**.
2. **Be Cautious** with links and attachments.
3. **Use Encryption**: Encrypt emails to protect content.
4. **Verify Email Addresses** carefully for small variations.
5. **Use Anti-Spam/Anti-Malware Filters**.
6. **Educate Users** on recognizing phishing.
7. **Digital Signatures**: Verify authenticity.
8. **Monitor Account Activity** for unusual behavior.

By understanding these threats and applying secure practices, users can better protect their email communications and data.

Viruses and antivirus software

Virus:

Viruses are malicious software (malware) designed to infect computers and spread from one device to another, often by attaching themselves to legitimate programs or files. They can cause various problems, including:

- **Data Corruption or Loss**: Deleting or altering files.
- **System Slowdowns**: Consuming system resources.
- **Theft of Personal Information**: Keylogging or stealing data.
- **Spreading to Other Devices**: Through email attachments, USB drives, or network connections.

Antivirus Software:

Antivirus software is designed to detect, prevent, and remove viruses and other types of malware. It works by:

1. **Scanning**: Checking files, emails, and websites for known malware signatures (patterns).
2. **Real-Time Protection**: Monitoring activities on the system to block suspicious behaviors.
3. **Quarantine**: Isolating infected files to prevent further damage.
4. **Heuristic Analysis**: Identifying new or modified viruses by examining suspicious behaviors.

Best Practices for Using Antivirus Software

- **Keep Antivirus Updated**: Regular updates ensure protection against new threats.
- **Schedule Regular Scans**: Automated scans can catch hidden threats.
- **Use Only Trusted Software**: Avoid free or suspicious antivirus tools that may be ineffective or harmful.

Firewall

A **firewall** is a security tool that monitors and controls network traffic, acting as a barrier between trusted and untrusted networks. It helps prevent unauthorized access to private networks.

Types of Firewalls

1. **Network Firewalls**: Hardware devices that protect entire networks.
2. **Host-Based Firewalls**: Software installed on individual devices.
3. **Next-Generation Firewalls (NGFW)**: Advanced firewalls with features like intrusion prevention and deep packet inspection.

How Firewalls Work

- **Rules-Based Filtering**: Allows or blocks traffic based on IP addresses, ports, and protocols.

  Example: Blocking all traffic except for web traffic (HTTP/HTTPS).

Benefits

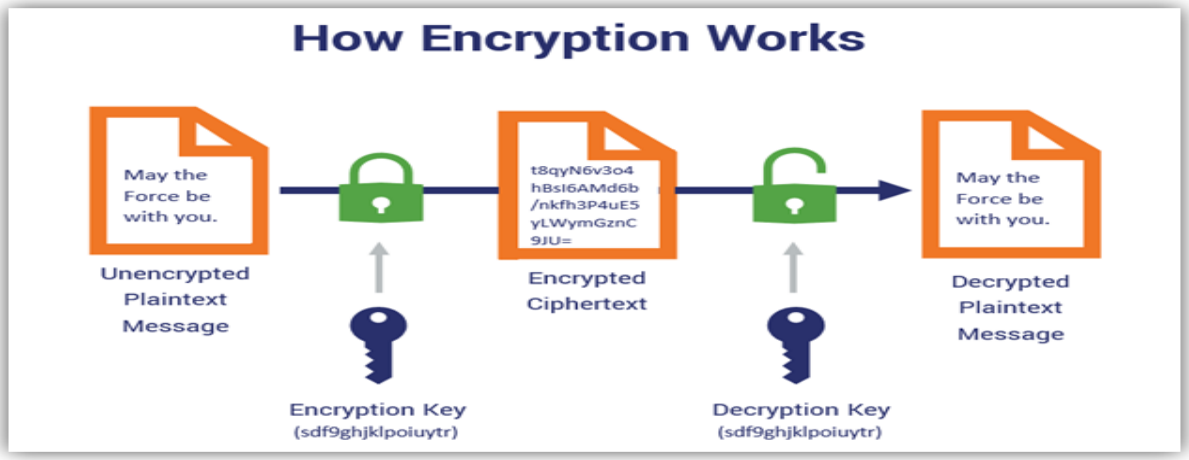
- **Blocks Unauthorized Access**.
- **Monitors and Logs Traffic**.
- **Stops Malware Before It Reaches the Network**.
- **Protects Privacy** by hiding internal IP addresses.

Cryptography

Cryptography is the practice of securing communication and information by transforming it into unreadable formats for unauthorized users. It ensures confidentiality, integrity, and authenticity of data.

Key Concepts

- **Plaintext**: Readable data.
- **Ciphertext**: Encrypted, unreadable data.
- **Encryption**: Converting plain text to ciphertext.
- **Decryption**: Converting cipher text back to plaintext.
- **Keys**: Strings used for encryption and decryption; can be symmetric or asymmetric.



Types of Cryptography

1. **Symmetric Cryptography**:
   - Same key for encryption and decryption (e.g., AES).
   - Fast and efficient for large data.
2. **Asymmetric Cryptography**:
   - Uses a public key for encryption and a private key for decryption (e.g., RSA).
   - Common for secure key exchanges and digital signatures.

Digital Signatures

Digital signatures are cryptographic tools that verify the authenticity and integrity of digital messages or documents, functioning like handwritten signatures but with greater security.

Key Concepts

- **Public Key Infrastructure (PKI)**: Uses a pair of keys:
  - **Private Key**: Kept secret by the signer for creating the signature.
  - **Public Key**: Shared with recipients for signature verification.

How They Work

1. **Signing**:
   - The sender creates a hash of the message and encrypts it with their private key to form the digital signature.
2. **Verification**:
   - The recipient hashes the received message and decrypts the digital signature using the sender's public key. If the hashes match, the message is verified.

Benefits

- **Authentication**: Confirms the signer's identity.
- **Integrity**: Ensures the message has not been altered.
- **Non-repudiation**: Prevents the signer from denying the transaction.

Copyright Issues

Copyright protects creators' rights over their original works (like books, music, and art). Here are key points in simple terms:

1. **Infringement**: Using copyrighted material without permission can lead to legal trouble.
2. **Fair Use**: Allows limited use of copyrighted work without permission for purposes like teaching or commentary, considering factors like purpose and amount used.
3. **Digital Rights Management (DRM)**: Tools that control how digital content can be used, sometimes limiting legitimate use.
4. **Plagiarism vs. Copyright Infringement**:
    - **Plagiarism**: Presenting someone else's work as your own (an ethical issue).
    - **Copyright Infringement**: Using someone else's work without permission (a legal issue).
5. **Copyright Duration**: Lasts for the creator's life plus 70 years; after that, works are in the public domain and can be used freely.
6. **Creative Commons**: Licensing that lets creators allow sharing of their work under specific conditions, like giving credit.
7. **International Copyright**: Treaties help protect copyrights across countries, but laws vary, making enforcement complex.

Understanding these points helps ensure respect for creators' rights and legal use of creative works.

GOI digital initiatives in higher education:

The Government of India (GOI) has launched several digital initiatives to enhance the quality, accessibility, and reach of higher education in the country. Here are some key initiatives:

SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, eacharya, e-Yantra and NPTEL.

SWAYAM:

- Swayam is a national digital platform that provides access to a wide range of educational resources, including audio and video lectures, online courses, and certification programs.
- It is an initiative by the Government of India to provide affordable and high-quality education to everyone.
- It designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality.
- Swayam offers courses and certification programs from top universities and institutions in India, covering various disciplines such as arts, science, engineering, agriculture, and more.
- The platform also provides fee waivers and scholarships to deserving students.
- This is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time.

- All the courses are interactive, prepared by the best teachers in the country and are available, free of cost to any learner. More than 1,000 specially chosen faculty and teachers from across the country have participated in preparing these courses.

- The courses hosted on SWAYAM are in 4 quadrants – (1) video lecture, (2) specially prepared reading material that can be downloaded/printed (3) self-assessment tests through tests and quizzes and (4) an online discussion forum for clearing the doubts.

SWAYAMPRABHA:

- SwayamPrabha is a group of free-to-air DTH (Direct-to-Home) channels launchedin 2017 by the Information and Broadcasting Ministry of India.
- There are 34 channels provide educational content to rural and underserved areas, with the aim of bridging the gap in education.
- The channels cater to various subjects, including mathematics, science, and social sciences, and are available 24/7.
- The SWAYAM PRABHA has new content everyday for at least (4) hours which would be repeated 5 more times in a day, allowing the students to choose the time of their convenience.
- The channels are uplinked from BISAG, Gandhinagar.
- The contents are provided by NPTEL, IITs, UGC, CEC, IGNOU, NCERT and NIOS.
- The INFLIBNET Centre maintains the web portal.

The DTH Channels covers the following:

1. Higher Education,
2. School education (9-12 levels)
3. Curriculum-based courses
4. Assist students (class 11th & 12th)

NATIONAL ACADEMIC DEPOSITORY:

- The vision of National Academic Depository (NAD) is born out of an initiative to provide an online store house of all academic awards.
- National Academic Depository (NAD) is a 24X7 online store house of all academic awards viz.certificates, diplomas, degrees, mark-sheets etc. duly digitised and lodged by academic institutions / boards / eligibility assessment bodies.
- NAD not only ensures easy access to and retrieval of an academic award but also validates and guarantees its authenticity and safe storage.
- National Academic Depository (NAD) is a digital repository developed by the University Grants Commission (UGC) in collaboration with the Indian Institute of Technology (IIT), Kharagpur.

NATIONAL DIGITAL LIBRARY OF INDIA:

- The National Digital Library of India (NDLI) is a digital library aggregator, designed to provide access to the vast digital resources available in the country, including books, journals, articles, etc. Established by the Ministry of Human Resource Development (MHRD).
- NDLI allows users to access and download digital content, including academic and research papers, textbooks, and other materials.
- The library aims to provide seamless access to broad range of digital resources, encouraging collaborative research, innovation, and knowledge sharing across academic, research and educational institutions in India.

E-SHODH SINDHU (ESS):

- E-Shodh Sindhu (eSS) is an Indian research portal that aims to provide easy access to a large collection of research articles, papers, and books in various fields, including science, technology, engineering, and mathematics.
- It is a collaborative initiative of the National Institute of Science Communication and Information Resources (NISCAIR) and the Indian Academy of Sciences (IAS).
- The portal features a comprehensive search facility, allowing users to retrieve research documents and publications from reputable sources.
- eSS aims to promote research and innovation in India by providing a single platform for access to scientific knowledge.

VIRTUAL LABS:

- Virtual Labs provide an immersive and interactive learning experience for students, allowing them to conduct experiments and investigations remotely.
- These online labs simulate real-world environments, giving learners hands-on experience with scientific equipment and techniques without the need for physical infrastructure.
- Virtual Labs can be accessed via online platforms, apps, or software, often with real-time supervision and guidance from instructors. By leveraging virtual labs, learners can develop their critical thinking, problem-solving, and data analysis skills while exploring various scientific and technological topics.

E ACHARYA:

- E acharya is a Sanskrit term that translates to "teacher" or "preceptor".
- In traditional Indian education, an acharya was a guru or a teacher who imparted knowledge and spiritual guidance to their students.
- The title is often bestowed upon revered religious leaders, philosophers, or learned individuals who have achieved a high level of expertise in their field.
- In modern times, the term is still used in India and other parts of South Asia to refer to respected teachers or educators who have attained a high degree of knowledge and understanding in their area of specialization.

E-YANTRA:

- e-Yantra is a National Mission on Education using Information and Communication Technology (ICT) initiated by the Ministry of Human Resource Development (MHRD), Government of India.
- The initiative aims to bridge the gap between the theoretical knowledge of students and their practical skills.
- e-Yantra provides hands-on training to students in robotics, embedded systems, and computer programming through simulation-based platforms.
- This project also focuses on capacity building, curriculum development, and setting up of state-of-the-art labs in educational institutions across the country.
- The ultimate goal is to empower students with industry-relevant skills to make them employable and globally competitive.

THE NATIONAL PROGRAMME ON TECHNOLOGY ENHANCED LEARNING (NPTEL):

- NPTEL is a collaborative initiative between the Indian Institute of Technology (IITs), Indian Institute of Science (IISc), Indian Institute of Management (IIMs), and other top technical institutions of India.
- Founded in 2001, NPTEL provides free online courses, educational resources, and video lectures on various subjects like engineering, sciences, and humanities.
- The program aims to enhance technical education in India by creating an online platform for sharing knowledge.
- NPTEL courses are taught by leading faculty members of Indian institutions and have been adopted by several universities and educational institutions world-wide.

DIGI LOCKER:

- Digi Locker is a digital locker service provided by the Government of India.
- It allows citizens to store and share sensitive documents, such as Aadhaar cards, driving licenses, and PAN cards, securely online.
- Users can download and upload documents to their digital locker using the DigiLocker app or website.
- The service is free, secure, and accessible 24/7.
- Digi Locker is issued in the form of a unique digital locker, which is linked to the user's Aadhaar number.
- It aims to reduce the use of physical documents and promote a paperless economy.