

ICT (Information and Communication Technology)

Complete Course Notes

1. Introduction to Information and Communication Technologies (ICT)

ICT stands for Information and Communication Technology. It refers to all technologies used to handle, store, transmit and communicate information. Computers, the internet, mobile phones, software, networks and all digital tools are part of ICT.

Components of ICT

Hardware refers to all the physical parts of a computer that can be touched. These include input devices such as keyboard, mouse and scanner, output devices such as monitor and printer, storage devices such as hard disk and USB, and the processing unit which is the CPU.

Software refers to programs and instructions that run on hardware. Software is of two types. The first is System Software such as the operating system (Windows, Android) which runs the computer. The second is Application Software such as MS Word, browsers and games which are made for specific purposes.

ICT Platforms are environments where users interact with technology. Examples include Google Workspace, Microsoft 365 and social media platforms.

Networks connect multiple computers together so that data and resources can be shared. A LAN (Local Area Network) connects computers within a building or campus. A WAN (Wide Area Network) connects cities or countries. The Internet is the largest global network in the world.

Data Storage is of two types. In local storage, data is saved on the user's own device such as a hard disk or USB. In cloud storage, data is saved on remote servers which can be accessed from anywhere through the internet, such as Google Drive and OneDrive.

Scope of ICT

ICT is used in every area of life in the modern world.

In education, ICT has transformed the way teaching and learning takes place. E-learning platforms, digital classrooms, online exams and educational videos have made learning easier and more interesting.

In business, ICT makes work faster and more efficient through online marketing, e-commerce, digital accounting and video conferencing.

In governance, governments use ICT for online services, citizen registration and tax filing, which is known as e-governance.

In healthcare, ICT has improved health services through electronic patient records, telemedicine, online doctor consultations and health tracking applications.

In digital media and entertainment, YouTube, Netflix, online news, digital photography and music streaming are all products of ICT.

Emerging Technologies and Future Trends

Artificial Intelligence (AI) refers to computers and programs that can think and learn like humans, such as ChatGPT. The Internet of Things (IoT) connects everyday objects to the internet, such as smart TVs and smart air conditioners. Blockchain is a secure digital record keeping system. Virtual Reality (VR) and Augmented Reality (AR) provide immersive digital experiences that feel real. 5G Networks provide extremely fast mobile internet. Cloud Computing means that storage and computing tasks are performed on remote servers instead of local devices.

2. Basic ICT Productivity Tools

Search Engines

Search engines are tools used to find information on the internet. The user types keywords and the search engine displays relevant results from millions of websites. Google, Bing and Yahoo are popular search engines. For effective searching, specific keywords should be used, quotation marks should be used for exact phrases, and filters such as date or type should be applied when needed.

Formal Communication Tools and Email Etiquette

Gmail and Microsoft Outlook are used for professional email communication. When writing an email, certain manners must be followed. The subject line should be clear, the greeting should be proper, the language should be formal, the email should be proofread before sending and replies should be sent promptly.

Microsoft Office Suite consists of three widely used programs. Microsoft Word is used to create and edit documents such as letters, reports and assignments. Microsoft Excel is used for spreadsheets, data management, calculations and charts. Microsoft PowerPoint is used to create presentations with slides.

Google Workspace

Google Workspace is a collection of cloud-based tools by Google. Google Docs is an online word processor that works like MS Word. Google Sheets is an online spreadsheet similar to MS Excel. Google Slides is an online presentation tool similar to MS PowerPoint. In all these tools, files are automatically saved in the cloud and can be easily shared with others.

Cloud Storage and File Sharing

Dropbox is a cloud storage and file sharing service in which files can be accessed from any device. Google Drive is Google's cloud storage service which is integrated with Google Docs, Sheets and Slides and provides 15 GB of free storage. Microsoft OneDrive is Microsoft's cloud storage which is integrated with Microsoft Office and automatically syncs with Windows computers.

Note-Taking Applications

Evernote is an application used for taking notes, organizing ideas and saving web pages. Notes can be tagged and searched easily. Microsoft OneNote is Microsoft's digital notebook in which notebooks, sections and pages can be created. It can include text, images, drawings and audio recordings.

Video Conferencing Tools

Video conferencing tools are used for online meetings, classes and communication. Google Meet is integrated with Gmail and Google Calendar. Microsoft Teams is used in schools, universities and businesses. Zoom is very popular for webinars and online classes. All these tools include features such as screen sharing, chat, recording and virtual backgrounds.

Social Media Applications

Social media platforms are used for social networking and communication. LinkedIn is used for professional networking and job searching. Facebook is used for social networking, groups and events. Instagram is a platform for sharing photos and videos. Twitter, also known as X, is used for short messages, news and public discussions.

3. ICT in Education

Learning Management Systems (LMS)

LMS are online platforms where teachers and students interact digitally. Moodle is an open-source LMS used in universities. Canvas is widely used in international universities. Google Classroom is simple, free and integrated with Google tools. These platforms allow users to upload assignments, take quizzes, use discussion boards and track grades.

Online Education Platforms

Coursera offers courses from top universities around the world, both free and paid. edX provides online courses from universities such as MIT and Harvard. Udemy offers courses on practical skills such as programming, design and business. eduflame provides completely free education in mathematics, science and other subjects for all levels from 9th to BS level.

Interactive Multimedia and Virtual Classrooms

Interactive multimedia includes videos, animations, simulations and games that are used for teaching purposes. Virtual classrooms allow real-time online teaching where students can see, hear and interact with the teacher. Zoom, Google Meet and Microsoft Teams are commonly used for this purpose.

4. ICT in Health and Well-being

Health and Fitness Tracking

Google Fit tracks steps, heart rate and exercise on Android devices. Samsung Health is a fitness tracking application for Samsung users. Apple Health tracks health and fitness data for iPhone users. Xiaomi Mi Band is an affordable fitness band that tracks steps, sleep and heart rate. Runkeeper uses GPS to track running routes, distance and speed.

Telemedicine and Online Health Consultations

Telemedicine allows patients to consult doctors online without visiting a clinic. OLADOC is a Pakistani platform where online doctor appointments and video consultations are available. Sehat Kahani provides online healthcare services for women in Pakistan. Marham connects patients with doctors in Pakistan. The benefits of telemedicine include saving time, being accessible in remote areas and reducing crowding in hospitals.

5. ICT in Personal Finance and Shopping

Online Banking and Financial Management Tools

JazzCash is a mobile wallet through which money can be sent, received and bills can be paid, particularly for Jazz users. Easypaisa is a mobile banking and wallet service for Telenor users. Zong PayMax is a mobile payment service for Zong users. ILINK and MNET are interbank fund transfer systems in Pakistan. Keenu Wallet is a digital payment wallet in Pakistan. All these tools allow money transfers, bill payments, mobile top-ups and shopping.

E-Commerce Platforms

E-commerce means buying and selling goods online. Daraz.pk is the largest online shopping platform in Pakistan, similar to Amazon. Telemart is a Pakistani e-commerce store selling electronics and other products. Shophive is an online store for electronics and gadgets in Pakistan. The process works as follows: the user browses products, adds them to the cart, pays online or through cash on delivery, and receives the goods at home.

6. Digital Citizenship and Online Etiquette

Digital Identity and Online Reputation

Digital identity is the information about a person that exists on the internet, such as social media profiles and online accounts. Online reputation is how others perceive a person based on their online activities and posts. One must always be careful about what is posted online because it can affect career and personal relationships. One should think before sharing anything because once something is posted, it is very difficult to permanently remove it.

Netiquette

Netiquette means behaving respectfully and politely on the internet. Polite language should be used in online messages, emails and forums. Writing in ALL CAPS should be avoided as it appears like shouting. The opinions of others should be respected even if one disagrees. Credit should be given to others when sharing their work. Rumors and unverified information should never be shared. Messages should be replied to within a reasonable period of time.

Cyberbullying and Online Harassment

Cyberbullying means using technology to threaten, embarrass or harm others. It takes various forms such as sending hurtful messages, spreading rumors online, sharing private photos without permission and excluding someone from online groups. Its effects include depression, anxiety, low self-esteem and in serious cases, self-harm. To deal with cyberbullying, one should not respond to the bully, should block them, save evidence of the harassment, report it to the platform and inform a trusted adult or authority.

7. Ethical Considerations in Use of ICT Platforms and Tools

Intellectual Property and Copyright

Intellectual property refers to creations of the mind such as books, music, software, art and inventions. Copyright is the legal right that protects the work of creators from being copied or used without their permission. Violations include copying a song, using software without a license and downloading movies illegally. Credit must always be given to the original creator when using their work.

Originality and Avoiding Plagiarism

Plagiarism means presenting someone else's work or ideas as one's own without giving proper credit. Its forms include copying text directly, paraphrasing without credit and submitting someone else's assignment as one's own. To avoid plagiarism, sources should always be cited, ideas should be expressed in one's own words and plagiarism checking tools such as Turnitin and Grammarly should be used. Unauthorized use of information sources is also considered unethical.

Content Accuracy and Integrity

Not all information on the internet is true. Fake news and misinformation spread very rapidly online. Misinformation refers to false information that is shared without the intent to deceive. Disinformation refers to false information that is deliberately spread to mislead people. Manipulation involves editing images, videos or facts to create a false impression, such as deepfakes. To verify information, one should check whether the source is a reliable website, look for multiple sources confirming the same fact, check the date of the article and use fact-checking websites. Only accurate and verified information should be shared in order to maintain content integrity.