SUBJECT: COMMUNICATIONS AND INFORMATION TECHNOLOGY	
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LESSON NO.: 1	VETTER: PROF. HARISH ARYA
BROADCASTING TECHNOLOGY	

STRUCTURE

1.0 LEARNING OBJECTIVES

After reading this lesson you will be able to-

- **Describe Broadcasting Technology.**
- **To learn how to Signal Generate, Transmit and Receive.**
- **Discuss the concept of Terrestrial Transmission.**
- **Discuss the role of Optical Fiber.**
- **Identify the wireless and Advance Telephony.**

1.1 INTRODUCTION

Broadcasting means the transmission of audio or audio-visual programs to a far distance. Such programs are generated, processed, and stored in analogue or digital form. The only

problem here is that they cannot be transmitted in analogue or digital form. To transmit these programs, we must first convert them into electromagnetic waves. In this lesson, we shall discuss the various concepts and technologies related to the broadcasting of radio and television programmes.

1.2 BROADCASTING TECHNOLOGY

Broadcasting is the process of sending and receiving audio and visual messages to a dispersed audience through the air or cable or communication satellite, by a scientific method called electromagnetic waves. These messages are transformed into electronic signals in the studio. It mixes the signal with the carrier waves, which is generated in the transmitter and the studio. The blending enables the electromagnetic waves to be moved at great speed, through the antenna and shot into the air. The air carries the waves as a medium and the signals are received by the sets in our homes and offices.

The main broadcasting mediums are radio and television. Radio broadcasting is the transmission of audio by the radio waves. Television broadcasting also uses radio frequencies, but includes video signals. Radio broadcasting signals can be either analogue or digital. Broadcasting, in its significance, reach and impact, is the most powerful medium of mass communication in India. Its importance as a medium of information and education is particularly great in a large and developing country like India.

Broadcasting in India is a national service developed and operated by the Government of India. All India Radio (also known as All India Radio) operates the service on a network of broadcast stations located across the country.

As a national service, catering to the complex needs of a vast country, All India radio seeks to represent in its national and regional programmes, the attitudes, aspirations and attainments of all Indian people and attempts to reflect, as fully and faithfully as possible, the richness of the Indian scene and the reach of the Indian mind.

In 2018, there were more than 369 operational private radio stations in more than 101 cities and towns across India. The Government of India-owned All India Radio has about 450 FM stations covering 39% of the area and 52% of the population of India.

Radio Broadcasting has several forms like AM, FM. These have several subtypes' namely Commercial broadcasting, Non-Commercial Educational (NCE), Public Broadcasting and Non-Profit Varieties as well as Community Radio, student-run campus radio stations and hospital radio stations etc. These stations uses short wave, medium wave or frequency modulation.

RADIO FREQUENCY BAND	USES IN
Short Wave	Locations where religious broadcasting is prohibited
Medium Wave	Rural Communities
Frequency Modulation	Community based radio stations
Internet Radio Web	Connected communities, dispersed people groups online

Television is defined as an audio-visual medium. It bends pictures with sound to produce a communication experience exhibited on the screen. It uses sound to explain the visuals presented on the screen. It addresses the emotion and intellect in a remarkable way. Television uses the movement of images in a unique way or pattern to express thought and feelings in an exciting and appealing manner. Television is defined by the BBC English Dictionary as the system of pictures and distances so, that people can receive them on a television set.

BASIC CONCEPTS OF BROADCASTING

Here, we discuss some basic concepts, related to transmission and broadcasting.

1. **Facsimile:** A facsimile is a copy or reproduction of something or a thing made to be similar to the original. For transmission purposes, an attempt is made to make exact copies of the original. For example, sound from a speaker is merely a copy of their original form.
2. **Fidelity:**Fidelity is the reproduction of anything with nearly or exactly the original quality or an accurate copy. Listeners use High fidelity for high-quality reproduction of sound.

3. **Transduction: Transduction means**the action or the process of converting something and especially energy or a message into another form. For transmission, we have to convert audio or audio-visual signals into electro-magnetic waves. For example, a microphone converts physical (sound) energy into electrical energy. Most of the sounds or images that we are getting involve at least three or four transducers through electric media. When a speech is recorded using a microphone, say. The microphone converts our speech into electrical signals. The electrical signal thus converted goes to the loud speakers, which can convert electrical signals back into sound. The signal between the microphone and the speaker is processed through other transducers such as a recorder. However, loss of fidelity is possible at each stage of transit.

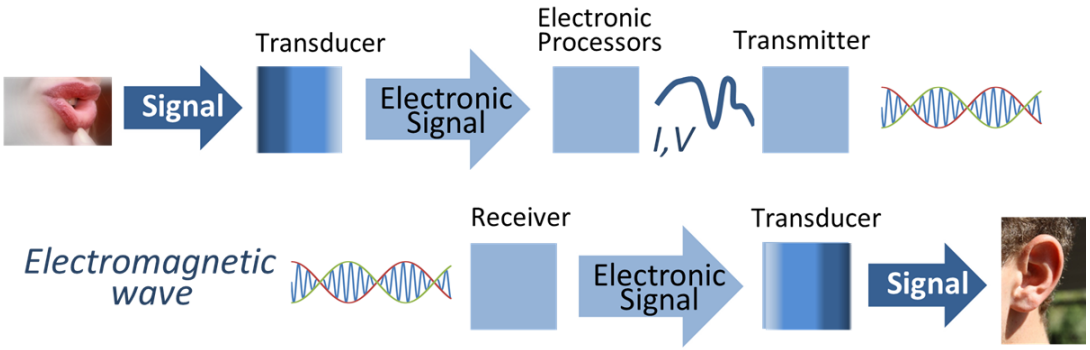


Fig. 1.1 Source: https://upload.wikimedia.org/wikipedia/commons/4/46/Signal_processing_system.png

By the 1980s, broadcasting used analogue signals. In the process, broadcast information (audio or audio-visual signal) is converted from one form of energy to another. This means converting energy from physical to electrical impulses. Simply, the electrical impulses are analogue or very similar to that of the physical energy recorded. These signals are known as analogue signals, which decay over time and space. This is because they only represent the original signal and can never be included all information is present in the original sound. This problem is greatly reduced in digital technology, in which each element of the audio and video signal is translated into its digital equivalent. Here, each element of an audio or audio-visual signal is represented by a binary code. A binary code has two values, such as 0 and 1. This is called "on-off", "yes-no" "open-shut". The sounds or images are transduced with the help of a laser beam.

As the signal goes through many transducers, so some information can be lost. This is called signal loss. During multiple transduction, there is a possibility to

add some unnecessary data, unwanted interference and noise into original. Signal to Noise Ratio is defined as the ratio of signal level to the noise level. The SNR is expressed in decibels. It is calculated by dividing the signal power by the noise power. A ratio larger than 1 dB indicates that the signal exceeds noise. Conversely, if the ratio is less than 1, it indicates that the noise level is larger than the signal level.

If the signal strength is less than the noise power, i.e. SNR <1, the signal becomes unusable.

When an audio component for example has an SNR of 100 dB, it means that the audio signal level is 100 dB higher than the noise level. This means that an SNR of 100 dB is better than one which is 70 dB for example.

4. **Sound:**Sound is a longitudinal, mechanical wave. It is defined as vibrations that travel through the air or another medium as an audible mechanical wave. It is produced from a vibrating body. That vibration set particles in the surrounding medium in vibrational motion, causing the auditory receptors to detect them. This is called sound.

As discussed before sound is one type of energy that can be moved through a wave. A sound wave is created due to pressure variations caused by vibrations. There are low pressure areas and high pressure areas. The high pressure areas are represented as crests and low pressure areas as troughs.

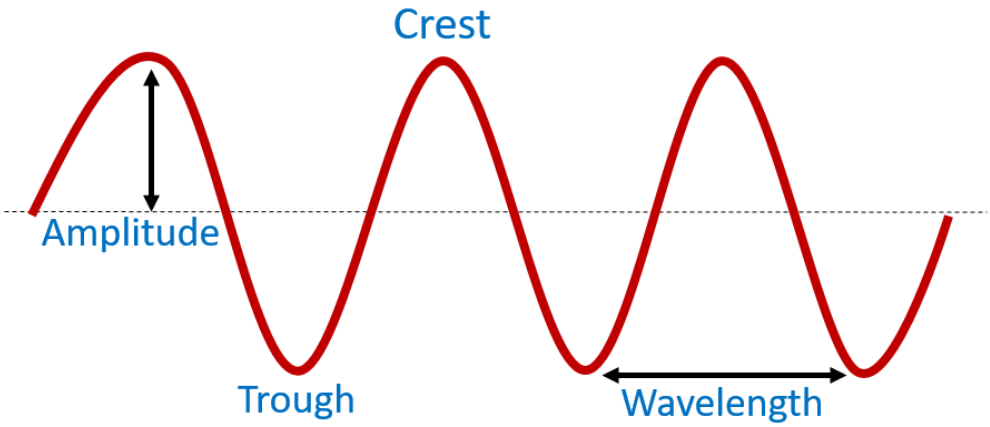


Fig. 1.2 Components of a Sound Wave

THE COMPONENTS OF A SOUND WAVE

a) Crests: The crest is the high point of a wave.

b) Trough: The trough is the bottom point of a wave.

c) **Wavelength:**The minimum distance in which a sound wave repeats itself is called its wavelength. That is it is the length of one complete wave. Also the wavelength can be found by measuring the length between crests or the length between troughs.

d) **Amplitude:**The amplitude is measured by finding the crest or trough and measuring to the half-way point. High amplitude means loud sound. Low amplitude means low sound.

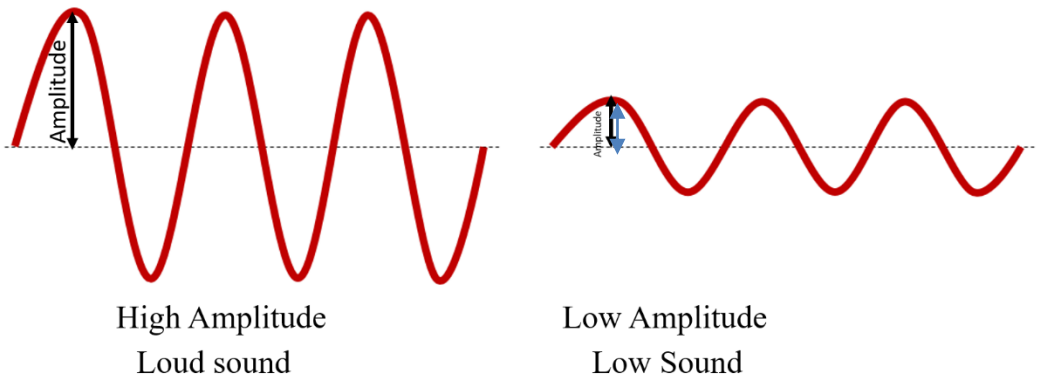


Fig. 1.3 Change in Volume

In the above Figure 1.3, the height of the wave has gotten smaller. This means the amplitude has changed along with the level of energy. It represent a change in volume.

e) **Frequency:**The number of complete waves or cycles produced in a specified time interval is called frequency of the wave. A standard measure of frequency is hertz (Hz). It is calculated in cycles per second.

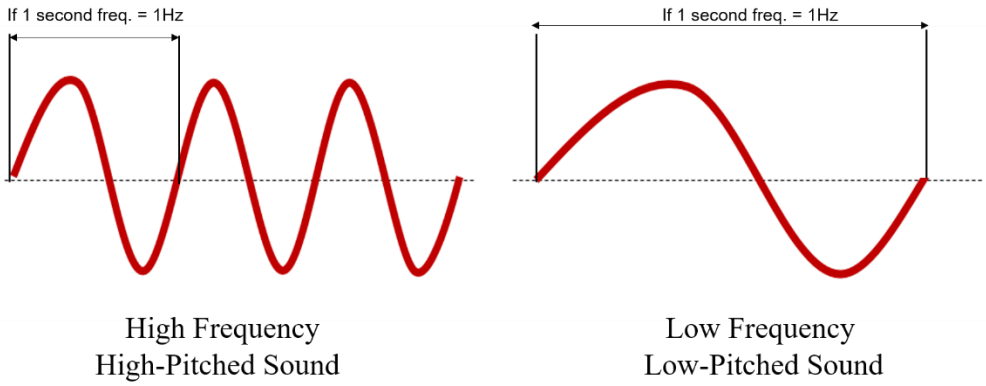


Fig: 1.4Change in Pitch

In the Fig. 1.4, the amount of waves has changed. When it makes more waves mean high frequency and when it makes less waves means less frequency. There is also a change in the wavelength.

Moreover, the human ear perceives (Acoustic Sound) frequencies between 20 Hz (lowest pitch) to 20 kHz (highest pitch). All sounds below 20 Hz are qualified as Infrasonic Sounds, although some animals (ex. mole-rat, or elephant) are hearing them. Similarly, all sounds above 20 kHz are qualified as Ultrasonic Sounds, but there are sounds for a cat or a dog (up to 40 kHz) or for a dolphin or a bat (up to 160 kHz). (Fig. 1.5)

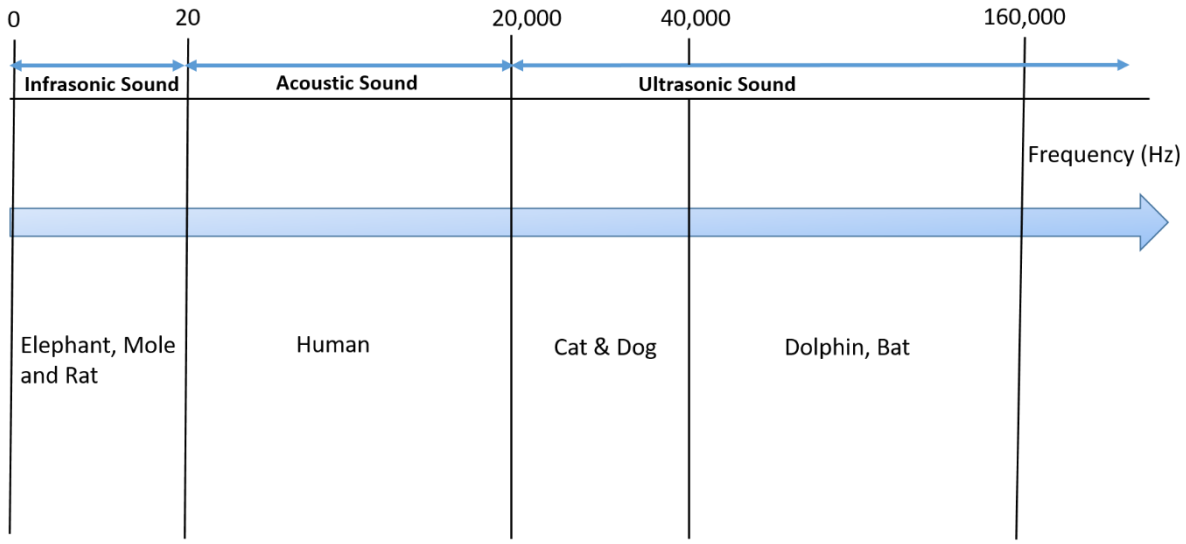


Fig. 1.5 Sound Frequency Range

1.2.1 SIGNAL PROCESSING

The following five general steps are involved in the signal processing:

1. Signal generation
2. Signal amplification and processing
3. Signal transmission
4. Signal reception
5. Signal storage.

1. Signal Generation

Signal generation is the conversion or transit of sound or light waves from a source to electrical energy that corresponds to the frequency of the original source. The audio signal

can be mechanically generated, using a microphone or turntable to conform to the original sound signal such as a phonograph record or audio cassette. Microphones are used to convert physical energy of music and voice into electrical energy. The audio signal can be electrically generated using a tape recorder. Audio signals can also be generated digitally using laser optics to create binary or digital equivalents of the original sound. Television signal generation requires electronic line-by-line scanning of the image using an electron beam to scan each element of the image. The image is later retrieved by the television receiver.

2. Signal Amplification and Processing

Audio and video signals are amplified and mixed and use audio consoles and video switchers. After the audio signal is converted from a physical sound wave to an electrical or digital facsimile, the audio signal must be amplified to boost the signal and be processed including mixing, combining and routing for broadcast transmission and / or recording. Sound sources are combined into the mixing board. The amplified sound can be corrected by using amplifiers and special effects. The switcher is used to mix the TV signal and air the desired picture. A special effects generator is used to connect transitions, partition screens, and keying. Digital video editing and effects can also be used through computer software such as Adobe Premiere Pro and After Effects.

3. Signal Transmission

The electronic signal is generated by a modulation process on a carrier wave or propagated by a radio station at its defined frequency. The sound wave generated can travel by land, sky and direct waves.

Sky waves radiate upward from the transmitter and either go into space or bounce off a part of the ionosphere (the Kennelly-Heaviside layer- which is a part of the atmosphere) to a distant spot on the Earth, a process called skipping.

Ground waves are conducted by soil and water and follow the curvature of the Earth until they dissipate, or attenuate.

Direct waves travel in a line of sight from the transmitter to the receiver. Their range is limited by the straight-line formed form the top of the autumnal to the horizon, which can be interrupted by tall buildings, mountains, etc.

Radio waves occupy a portion of the electromagnetic spectrum. AM radio channel frequencies are divided into three main types: clear channels, regional channels, and local channels. FM channel frequencies are classified by the height and power of the antenna.

Stereo broadcasts and other non-broadcast services are accomplished with the broad bandwidth of an FM channel. Digital radio is satellite-based or channel-in-band. Television signal transmission involves induction of wire on the VHF and UHF portions of the spectrum using electromagnetic radiation or by using a coaxial cable through a cable system that can have programming on more than 100 channels. New transmission technology used for transmission and distribution includes satellite and fiber optics for digital signals.

4. **Signal Reception**

After transducing, modulating, and transmitting radio signals, the radio waves are picked up on a radio receiver, where they are transduced or converted into sound waves by the speaker system. The characteristics of the electromagnetic spectrum and modulation method used in transmission determine the type of radio receiver needed to convert the signal back into sound waves. There are several types of radio receivers including AM, AM stereo, FM, shortwave and multiband. These receivers may be equipped with analogue tuners or digital systems. Both large and small screen televisions are now receiving high-definition television vision signals for moving images.

5. **Signal Storage**

Both audio and video techniques are used in the storage and retrieval of sounds and moving images. The audio or video signal is transduced or converted to storage and final playback or rebroadcast. Storage medium includes computer hard drives including glass discs, wires, vinyl, magnetic type, compact discs, video tapes, digital storage media such as digital versatile discs (DVDs) and high-capacity disk drives.

1.2.2 MICROWAVE LINKS

A microwave link is a communication system that uses a beam of radio waves in the microwave frequency range to transmit video, audio, or data between two locations, ranging from just a few feet or meters to several miles or kilometers apart.

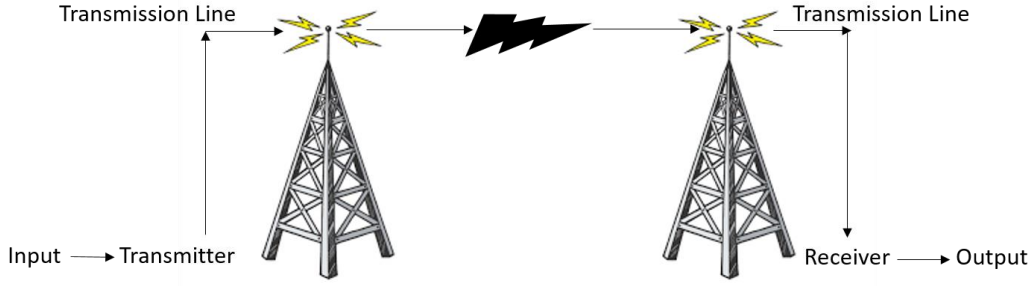


Fig. 1.6 Microwave Link Transmission

Microwaves are important for many forms of communication and affect a wide range of industries. Broadcasters use a microwave link to send programs from the studio to the transmitter location, which may be miles away. Microwave links carry cellular telephone calls between cell sites. Wireless Internet service providers use microwave links to provide high-speed Internet access to their customers without the need for a cable connection. Telephone companies transmit calls between switching centres over microwave links, although recently they have been largely suppressed by fiber-optic cable. Companies and government agencies use them to provide communication networks between nearby facilities within an organization, such as a company with multiple buildings within a city.

One reason for microwave links is so favourable that they are broadband. This means that they can transfer large amounts of information at high speeds. Another important quality of microwave links is that they require no equipment or facilities between the two terminal points, so installing a microwave link is often faster and less expensive than a cable connection. Finally, they can be used almost anywhere, as long as the distance travelled is within the operating range of the devices and there is a clear path between locations (i.e. no solid obstacle). Microwaves are also able to penetrate rain, fog, and snow, meaning that bad weather does not impede transmission.

A simple one-way microwave link includes four key elements: a transmitter, a receiver, transmission line, and antennas. These basic components are present in every radio communications system, including cellular telephones, two-way radios, wireless networks, and commercial broadcasts. But the technology used in microwave links differs from that used in low frequencies (long wavelengths) in the radio spectrum. Techniques and components that work well at low frequencies are not usable at high frequencies (shorter wavelengths) used in microwave links. For example, ordinary wires and cables function poorly as conductors of microwave signals. On the other hand, microwave frequency allows engineers to take advantage of some principles that are impractical to apply at low frequencies. An example is the use of a parabolic or "dish" antenna to focus the microwave radio beam. Such antennas can be designed to operate at very low frequencies, but they will be too large to be economical for most purposes.

The transmitter in the microwave link produces a microwave signal that carries the information being transmitted. That information — input — can be anything sent via

electronic means, such as telephone calls, television or radio programs, text, moving or still images, web pages, or a combination of those media.

The transmitter has two fundamental functions: generating microwave energy at the required frequency and power level, and modifying it with an input signal so that it receives meaningful information. Modulation is accomplished by isolating some characteristic of the energy in response to the input of the transmitter. An example of flashing light modulation is for transmitting a message in Morse code. Different lengths of the flashes (dots and dashes), and dark gaps between them, give information in this case - a text message.

The second integral part of a microwave link is a transmission line. This line carries signals from the transmitter to the antenna and, at the receiving end of the link, from the antenna to the receiver. A transmission line is anything that conducts current from one point to another. Lamp transmission, power lines, telephone wires and speaker cables are common transmission lines. But at microwave frequencies, those media highly weaken the signal. In their place, engineers use coaxial cables and, in particular, hollow pipes called waveguides.

The third part of the microwave system is the antennas. At the transmitting end, the antenna emits the microwave signal from the transmission line into the free space. "Free-space" is the emptiness or zero between the transmission and the receiving antennas. This is not the same as "atmosphere", because air is not necessary for radio transmissions of any kind (which is why radio works in the vacuum of outdoor space). At the receiver site, an antenna pointing to the transmitting station collects the signal energy and feeds it to the transmission line for processing by the receiver.

The antennas used in microwave links are highly directional, meaning that they tightly concentrate the transmitted energy, and receive energy mainly from a specific direction. This is in contrast with antennas used in many other communication systems, such as broadcast. By directing the energy of the transmitter, where it is needed — toward the receiver — and centering the received signal, this feature of microwave antennas allows communication over long distances using small amounts of power.

Between the antennas of the link lies another important element of the microwave link - the path taken by the signal through the Earth's atmosphere. A clear path is critical to the success of microwave links. Since microwaves essentially travel in straight lines, man-made

obstacles (including possible future constructions) that can block signals must either be overcome by long antenna structures or avoided altogether. Natural barriers also exist. Flat terrain can create undesirable reflections, precipitation can absorb or disperse some of the microwave energy, and the emergence of foliage in the spring may weaken a slightly stronger signal, which was sufficient when trees were bare in winter. Engineers must take into account all current and potential problems when designing microwave links.

At the end of the link in the last component, the receiver. Here, information is extracted from the microwave signal and made available in its original form. To accomplish this, the receiver must demodulate the signal to separate the information from the microwave energy that carries it. The receiver must be able to detect a very small amount of microwave energy because the signal does a lot of loss of its strength on its travel.

This entire process occurs close to the speed of light, so transmission is almost instantaneous even over long distances. With all their benefits, microwave links are important building blocks of the world's communications infrastructure for years to come.

1.2.3 TERRESTRIAL TRANSMISSION

Terrestrial television is the traditional method of television broadcasting in which the television signal is transmitted by radio waves from the terrestrial (earth-based) transmitter of a television station to a TV receiver having an antenna. It is also known as over-the air or OTA. Terrestrial television was the first technology used for television broadcasting. The BBC began broadcasting in 1929 and by 1930 many radio stations had a regular schedule of experimental television programmes. However, these early experimental systems had insufficient picture quality to attract the public, due to their mechanical scan technology. But there was virtually no other method of television delivery until the 1950s. It is only later that cable television arrived.

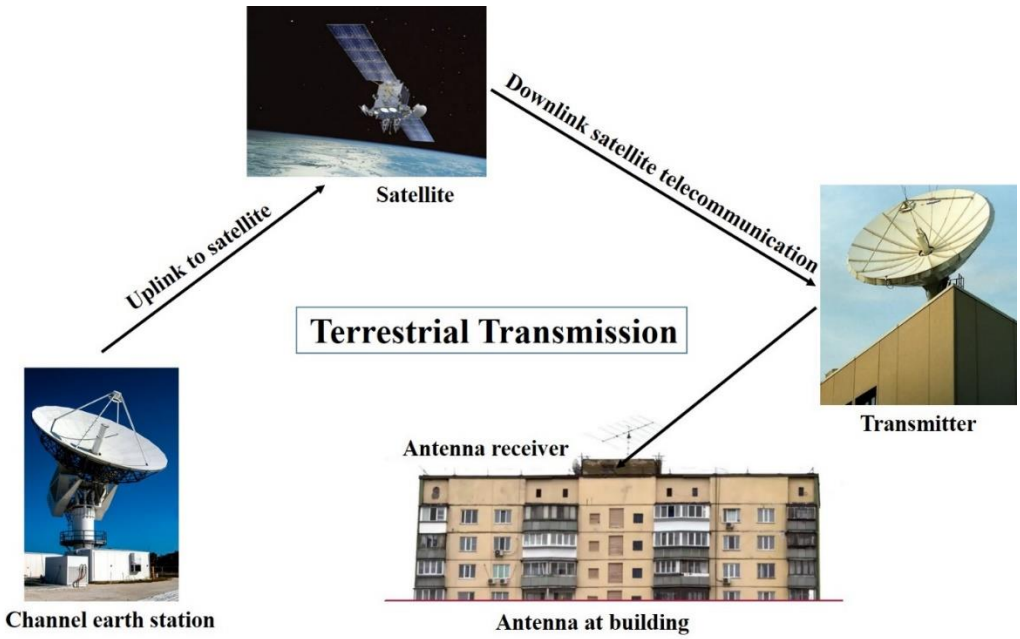


Fig. 1.7 Terrestrial Transmission

Terrestrial television channels are transmitted via ultra-high frequency (UHF). These signals 'travel' in straight lines rather like rays of light. When they fail to reach anyone, it is often because of the shielding effect of mountains, hills, or large buildings. As a result, hundreds of low-power relay stations have been built for analogue to fill in the gaps.

Some of the features of terrestrial transmission are as follows.

1. **Antennae:** The antenna receives the signal from the transmitter and sends it via a cable to the TV set. Television waves travel in straight lines like light rays. As a result, wherever you live, the receiving aerial should be out, as high as possible, and in clear, so that it gets the best direct signal. Branded aerials are often preferred over unbranded ones to elicit high quality signals.

   A good way to mount the antenna is a crank-shaped, stand-off pole. Vertical polarized aerials should be fixed to the pole using an end-mount behind the reflector. The cable from the antenna to the TV set can become brittle due to continuous exposure to sunlight, and water ingress causes signal loss. Antennas and cables may need to be replaced more frequently in exposed, coastal or industrial areas.
2. **Masthead pre-amplifiers:**Masthead preamplifiers (or boosters in common parlance), mounted close to the aerial (according to the manufacturer's instructions) and power fed through the cable, can help improve picture quality if the signals are weak or a Long cable is required. However, a pre-amplifier will not improve in cases where

ghosting or interference is a problem because the signal will be amplified as well as 'interference'. Masthead preamplifiers can also give disappointing results if they are used to boost signals from a distant station in the presence of strong local signals as the latter can lead to overloading.

3. **Reflections:** The reflection on the TV picture is caused by reflected signals from the hills, tall buildings, etc., reaching the air at a small fraction of a second after a direct signal from the transmitter. These delayed signs appear on the right side of the main image on the screen. The antenna needs to be guided and fitted well to reject unwanted signals.
4. **Co-channel interference:**Sometimes during fine weather, horizontal Venetian blind-type lines or even other TV pictures interfere with reception. A good directional aerial will help mitigate these effects, which are caused by receiving at far greater distances from distant stations.

To overcome such problems in analogue terrestrial broadcasts, broadcasters have switched from analogue to digital by changing the transmission format to digital terrestrial transmission. Digital terrestrial broadcasting enables a broadcaster to deliver relatively high quality audio / video signals to viewers. Additionally, digital terrestrial broadcasting has another major advantage. It is a high spectrum of efficient technology. While the analogue TV transmitter transmits a signal TV program channel through a 7/8 MHz-wide RF channel, a digital terrestrial broadcast (DTT) transmitter transmits five to six TV channels through a single RF channel. A broadcaster can use this increased capacity to distribute more TV programs.

1.2.4 OPTICAL FIBER

An optical fiber is a long, flexible, transparent thin strands of very pure glass about the size of a human hair. They are arranged in bundles called optical cables and uses lightwave technology to transmit the data over fiber by changing electronic signals into light. It delivers hundreds of times higher bandwidth than traditional electrical systems.

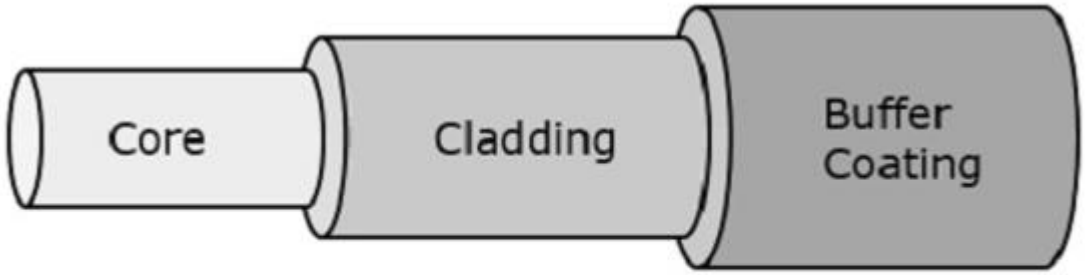
Some exceptional characteristic features of this type of communication system like large bandwidth, smaller diameter, lightweight, long-distance signal transmission, low attenuation, transmission security, and so on make this communication a major building block in any telecommunication infrastructure.

This type of communication can transmit voice, video, telemetry and data through local area networks or across long distances. It is used by many telecommunications companies to transmit telephone signals, Internet communication and cable television signals. It is also used in a multitude of other industries, including medical, defense/government, for data storage, and industrial/commercial.

STRUCTURE OF OPTICAL FIBER

The general structure of the optical fiber includes the following three parts.

1. Core
2. Cladding
3. Coating



Parts of an Optical fiber

1. **Core:**The core, which carries the light, is the smallest and the most important part of the optical fiber. The optical fiber core is usually made of glass, although some are made of plastic.
2. **Cladding:**The cladding is the second layer on top of the core. It is also made of glass or plastic. Its glass or plastic is less dense. Cladding is used in optical fiber for prevent any refraction while passing data. The function of cladding is to occur full internal reflection in optical fiber. That is why a cladding's density is lower than core.
3. **Coating or Jacket:** The cladding is enclosed in an additional layer for extra protection is called the coating or jacket. It is made up of flexible and abrasion-resistant varieties of plastic. Usually, the jacket has another layer beneath it called a buffer. The buffer and the jacket together protect the optical fiber from environmental and physical damage.

The buffer is elastic in nature and prevents abrasions. The buffer also prevents the optical fiber from scattering losses caused by microbends. Microbends occur when an optical fiber is placed on a rough and distorted surface.

ADVANTAGES & DISADVANTAGES OF OPTICAL FIBER

Though optical fiber has speed and bandwidth advantages over copper cable, it also contains some drawbacks. Here are the advantages (Functional and Physical) and disadvantages of optical fiber cable.

FUNCTIONAL ADVANTAGES

Functional advantages of Optical Fiber are:

1. The transmission bandwidth of the fiber optic cables is higher than the metal cables.
2. The amount of data transmission is higher in fiber optic cables.
3. The power loss is very low and hence helpful in long-distance transmissions.
4. Fiber optic cables provide high security and cannot be tapped.
5. Fiber optic cables are the most secure way for data transmission.
6. Fiber optic cables are immune to electromagnetic interference.
7. These are not affected by electrical noise.

PHYSICAL ADVANTAGES

The Physical advantages of Optical fiber are:

1. **Greater bandwidth and faster speed-** Optical fiber cable supports extremely high bandwidth and speed. Its most important advantage is the large amount of information transmitted per unit of optical fiber cable.
2. **Cheap-**The raw material for the manufacture of fiber optic cables is glass, which is cheaper than copper.
3. **Thin and Lightweight-** Optical fiber is thinner, and can be drawn smaller in diameter than copper wire. They are smaller in size and lighter weight than comparable copper wire cables.
4. **High carrying capacity-** Because optical fibers are much thinner than copper wires, more fibers can be tied into a given-diameter cable.

5. **Low signal degradation-** The loss of signal in optical fiber is less than that of copper wire.
6. **Light signals-** Unlike electrical signals transmitted to copper wires, light signals from one fiber do not interfere with other fibers in the same fiber cable. This means a clear phone conversation or TV reception.
7. **Long life span -** Optical fibers typically have a life cycle of more than 100 years.

DISADVANTAGES OF OPTICAL FIBER

Disadvantages of Optical Fiber are:

1. **Low power-** Light emitting sources are limited to low power. Although high power emitters are available to improve the power supply, this will add additional costs.
2. **Fragility-** Optical fiber is fragile and more vulnerable to damage than copper wires. Hence, more protection is needed than copper ones.
3. **Distance-** The distance between the transmitter and receiver must be kept short or require repeaters to boost the signal.
4. **Costly**-Though fiber optic cables last longer but its installation cost is high.

APPLICATIONS OF OPTICAL FIBER

The Optical fibers have many applications. Some of them are as follows-

1. Used in telephone systems.
2. Used in sub-marine cable networks.
3. Used in data linkfor computer networks, CATV Systems.
4. Used in CCTV surveillance cameras.
5. Used for connecting fire, police, and other emergency services.
6. Used in hospitals, schools, and traffic management systems.
7. They have many industrial uses and also for in heavy duty constructions.

1.2.5 WIRELESS COMMUNICATION

The term wireless communication was introduced in the 19th century and wireless communication technology has evolved in subsequent years. It is the most important means of transmitting information from one device to another. In this technique, information can be transmitted through the air using electromagnetic waves such as IR, RF, satellite, etc. without the need for any cables or wires or other electronic conductors.

Through Wireless communication the transmitted distance can be anywhere between a few meters (for example, a television's remote control) and thousands of kilometers (for example, radio communication).

Cellular telephony, wireless access to the Internet, wireless home networking, and so on can be used for wireless communication.

Other examples of radio wireless technology applications include GPS units, garage door openings, wireless computer mice, keyboards and headsets, headphones, radio receivers, satellite television, broadcast television, and cordless telephones.

Wireless communication involves the transfer of information without any physical connection between two or more points. Because of this absence of any 'physical infrastructure', Wireless communication has several advantages. They are cost-effective, Flexible, Convenient, speedy, Accessible, and Constant Connectivity.

In the present day, wireless communication systems have become an essential part of various types of wireless communication devices, which allow the user to communicate even from remote operated areas. Many devices are used for wireless communication such as mobile devices. Cordless telephone, Zigbee wire technology, GPS, Wi-Fi, satellite television, and wireless computer parts. Current wireless phones include 3 and 4G networks, Bluetooth, and Wi-Fi technology.

1.2.6 WIRELESS & ADVANCED TELEPHONY

Telephone service that uses radio waves, rather than landlines, to connect the person initiating a call to a telephone network is called wireless telephony. Using wireless telephony, people can get information from anywhere. Today, wireless telephony can be possible through mobile/cell phones/smartphones. Prior to smartphones, cordless phones came on the market in the form of wireless telephony.

Cordless phones are devices which consisting of a base station and a handset sold as a set for use within the home. These are never used for networking, because of its limited range; usually it’s expected range up to the same building or some short distance from the base station. The base station attaches to the telephone network the same way a corded telephone does. Then came the mobile phone. Mobile phones are also known as wireless telephony which is highly possible for making and receiving calls on a radio frequency carrier while the mobile user is moving to a telephone service area. Radiofrequency is

responsible for establishing a connection to a mobile phone operator's switching system, which provides access to the public switched telephone network (PSTN). Most modern mobile telephone services use a cellular network architecture, and therefore mobile telephones are often called cellular telephones or cell phones. Now the mobile phone turned into a smartphone. The term smart phone is a rather loose term, only creating a distinction between regular phones and mobile phones that support operating systems and advanced capabilities such as word processing, email and Internet access, etc. Smartphones are also used in applications.

Smartphones allow people to stay connected to the Internet wherever they go. They allow everyone from businessmen to college students to write a quick word document, relax by playing a quick game of solitaire, or simply check their email. In the year 2019, 373 million Indians used smartphones. The number of smartphone users is estimated to reach 442 million in 2022.

1.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. **What type of waves are Sound Waves?**
   a) Latitudinal waves
   b) Longitudinal waves
   c) Latitudinal mechanical waves
   d) Longitudinal waves
2. Before the main shock waves, the earthquake produces the characteristic sound waves which some animals like rhinoceros can hear. Can you guess the kind of sound waves produced here?
   a) Infrasonic sounds
   b) Ultrasonic sounds
   c) Audible Sounds
   d) None of these

3. The bats can fly in the darkness of night without colliding with the other objects by emitting special sounds while flying. Which characteristic of sound is used by the bats to navigate?

a) Ultrasound

b) Infrasound

c) Audible sound

d) None of these

4. What do we call the distance between two consecutive compressions of a sound wave?
   a) Wave number
   b) Frequency
   c) Wavelength
   d) Amplitude
5. What is the relationship between the frequency and the pitch of a sound wave?
   a) Higher the frequency, higher the pitch
   b) Lower the frequency, higher the pitch
   c) Pitch is not dependant on the frequency
   d) None of the above

B. FILL IN THE BLANKS.

1. The minimum distance in which a sound wave repeats itself is called its ……..
2. The number of complete ……or …….. produced in a specified time interval is called frequency of the wave.
3. The …… receives the signal from the transmitter and sends it via a cable to the TV set.
4. …… communication involves the transfer of information without any physical connection between two or more points.
5. Smartphones allow people to stay connected to the ……. wherever they go.

1.4 SUMMARY

- Broadcasting means the transmission of audio or audio-visual programs to a far distance.
- Radio Broadcasting has several forms like AM, FM.
- These stations uses short wave, medium wave or frequency modulation.
- Basic concepts of broadcasting that is related to transmission and broadcasting are Facsimile, Fidelity, Transduction and Sound.
- Components of a sound waves are Crests, Trough, Wavelength, Amplitude and Frequency.

- Signal generation is the conversion or transit of sound or light waves from a source to electrical energy that corresponds to the frequency of the original source.
- The electronic signal is generated by a modulation process on a carrier wave or propagated by a radio station at its defined frequency. The sound wave generated can travel by land, sky and direct waves.
- A microwave link is a communication system that uses a beam of radio waves in the microwave frequency range to transmit video, audio, or data between two locations, ranging from just a few feet or meters to several miles or kilometers apart.
- Terrestrial television is the traditional method of television broadcasting in which the television signal is transmitted by radio waves from the terrestrial (earth-based) transmitter of a television station to a TV receiver having an antenna.
- An optical fiber is a long, flexible, transparent thin strands of very pure glass about the size of a human hair. They are arranged in bundles called optical cables and uses lightwave technology to transmit the data over fiber by changing electronic signals into light.
- Wireless communication is the most important means of transmitting information from one device to another. In this technique, information can be transmitted through the air using electromagnetic waves such as IR, RF, satellite, etc. without the need for any cables or wires or other electronic conductors.
- Telephone service that uses radio waves, rather than landlines, to connect the person initiating a call to a telephone network is called wireless telephony.

1.5 KEYWORDS

Broadcasting: Broadcasting means the transmission of audio or audio-visual programs to a far distance.

Microwave links:A microwave link is a communication system that uses a beam of radio waves in the microwave frequency range to transmit video, audio, or data between two locations, ranging from just a few feet or meters to several miles or kilometers apart.

Optical Fiber: An optical fiber is a long, flexible, transparent thin strands of very pure glass about the size of a human hair. They are arranged in bundles called optical cables and uses lightwave technology to transmit the data over fiber by changing electronic signals into light. It delivers hundreds of times higher bandwidth than traditional electrical systems.

Signal Generation: Signal generation is the conversion or transit of sound or light waves from a source to electrical energy that corresponds to the frequency of the original source.

Core: The core, which carries the light, is the smallest and the most important part of the optical fiber. The optical fiber core is usually made of glass, although some are made of plastic.

Cladding: The cladding is the second layer on top of the core. It is also made of glass or plastic. Its glass or plastic is less dense.

Coating or Jacket: The cladding is enclosed in an additional layer for extra protection is called the coating or jacket. It is made up of flexible and abrasion-resistant varieties of plastic.

Wireless Communication: Wireless communication is the most important means of transmitting information from one device to another. In this technique, information can be transmitted through the air using electromagnetic waves such as IR, RF, satellite, etc. without the need for any cables or wires or other electronic conductors.

Wireless Telephony: Telephone service that uses radio waves, rather than landlines, to connect the person initiating a call to a telephone network is called wireless telephony.

Terrestrial transmission: Also called over-the air (OTA); a traditional way of broadcasting TV signals.

1.6 SELF-ASSESEMENT TEST

1. Define Broadcasting Technology.
2. How is Signal Generated?
3. How Signal generate, Transmit and Receive.
4. What is Optical Fiber Used for?
5. What are Microwave Signal?
6. What do you mean by Microwave Communication?
7. What is Wireless Telephony?
8. Explain Terrestrial Tansmission.

1.7 ANSWERS TO CHECK YOUR PROGRESS

A. ANSWERS OF CHOOSE THE RIGHT OPTTION.

1. **d)**Longitudinal waves
2. **a) Infrasonic sounds**
3. **a) Ultrasound**
4. **c)**Wavelength
5. **a)**Higher the frequency, higher the pitch

B. ANSWERS OF FILL IN THE BLANKS.

1. Wavelength
2. Waves, cycles
3. Antenna
4. Wireless
5. Internet

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SUBJECT: COMMUNICATIONS AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. SUNAINA
LESSON NO.: 2	VETTER: PROF. HARISH ARYA
RADIO BROADCASTING	

STRUCTURE

2.0 LEARNING OBJECTIVES

After reading this lesson you will be able to:

- **Understand Radio Broadcasting.**
- **Describe different modes of AM& FM transmission.**
- **Use a particular radio band.**
- **Know what mode of transmission is being used.**
- **Discuss the concept of Satellite Transmission & Cable TV Transmission.**
- **Understand CAS, DTH & Digital Transmission.**

2.1 INTRODUCTION

In the previous lesson we discussed on Broadcasting Technology, Signal Generation and Transmission, terrestrial Transmission and Advance telephony. In this lesson we study on Radio Broadcasting, Cable Television, Satellite transmission, DTH and Digital Transmission etc.

2.2 RADIO BROADCASTING

Radio has been used not only as an effective medium for informing and educating the people, but also played a very important role in the economic, political and cultural development of nations. It is especially a medium of sound.

It is a one-way wireless transmission over radio waves designed to reach a wider audience. This has the unique advantage of being available through low cost, battery powered, portable sets even in rural areas.

Stations can be linked in radio networks to broadcast common programming, either in syndication or simulcast or both. Audio broadcasting also can be done via cable FM, local wire networks, satellite and the Internet.

The signal types can be either analogue audio or digital audio.

Radio broadcasting is done through AM and FM stations. There are several subtypes, namely commercial broadcasting, non-commercial educational (NCE) public broadcasting, and non-profit varieties, as well as community radio, student-run campus radio stations and hospital radio stations that can be found worldwide.

2.2.1 RADIO WAVES

Radio waves are a type of electromagnetic radiation, known for use in communication technologies, such as television, mobile phones, and radio. These devices receive radio waves and convert them into mechanical vibrations in the speaker to create sound waves.

The radio-frequency spectrum is a relatively small part of the electromagnetic (EM) spectrum. The EM spectrum is usually divided into seven regions in order of decrease in wavelength and increase in energy and frequency.

ELECTROMAGNETIC SPECTRUM

Sr. No.	SPECTRUM	MEGAHERTZ
1.	Radio Waves EHF SHF UHF VHF HF MF LF VLF ELF	300,000
2.	Infrared range	10^7
3.	Visible Light Violet Indigo Blue Green Yellow Orange Red	10^8
4.	Ultraviolet Rays	10^9-10”
5.	X-ray	10^{13}
6.	Gamma rays	10^{16}
7.	Cosmic rays	10^{18}

Radio waves have the longest wavelengths in the Electromagnetic Spectrum. It is divided into nine bands.

BAND	FREQUENCY RANGE
1. Extremely Low Frequency (ELF)	<3KHz
2. Very Low Frequency (VLF) Very Long Range Military Communication	3 to 30 KHz
3. Low Frequency (LF) Navigation Signals Long Wave	30 to 300 KHz
4. Medium Frequency (MF) AM Channels HAM Radio	300 KHz to 3 MHz
5. High Frequency (HF) Short-Wave HAM Radio	3 to 30 MHz
6. Very High Frequency (VHF) FM Channels VHF Television AIR Navigation	30 to 300 MHz
7. Ultra High Frequency (UHF) UHF Television Radar Weather Satellite	300 KHz to 3 GHz
8. Super High Frequency (SHF) Radar	3 to 30 GHz

KU and CL and Communication Satellites	
9. Extremely High Frequency (EHF) Military Communication Developing Technologies	30 to 300 GHz

MODE OF RADIO TRANSMISSION

There are different ways that Electromagnetic waves are transmitted through the Earth's atmosphere. These different ways are called modes of transmission. The transmission mode depends on the wavelength (frequency) of the radiation and on the particular use. Three common modes are the Skywaves, Ground Waves and the Direct Waves.

1. **Sky Waves:** Skywaves radiate upward from the transmitter and either go into space or bounce off a part of the ionosphere (the Kennelly –Heaviside layer-which is a part of the atmosphere) to a distant spot on the earth, a process called skipping.

2. **Ground Waves:** Ground Waves are conducted by soil and water and follow the curvature of the Earth until they dissipate, or attenuate.

3. **Direct Waves:** Direct Waves travel in a line of sight from the transmitter to the receiver. Their range is limited by the straight-line formed from the top of the autumnal to the horizon, which can be interrupted by the tall buildings, mountains, etc.

Certain propagation methods work better in different portions of the electromagnetic spectrum, enabling stations to vary their power and antenna angles for maximum coverage with minimum interference.

The medium-wave band is particularly suited to ground and skywave propagation. AM stations have generally located their transmitters in low land areas. They bury part of their transmitters in the ground to use the conductivity of the ground wave and may use three or four antennas arranged in a geometrical grid pattern to make sure the signal radiates throughout their coverage area. AM stations also beam a signal upward to make use of the skywave. That is why some AM stations can be heard over great distances at night.

The primary coverage area of AM station is the range of that station's ground wave. The secondary coverage area is the limits of an acceptable sky wave. Wet soil, more power, etc, allows greater coverage for AM stations.

High Frequency response and high signal-to-noise ratio are the advantages of FM stations. However, they require more bandwidth, higher power, and taller towers to perform their noise-free magic. But the higher bandwidth of FM allows the FM stations to transmit more than one signal through their channel. Such signals use the area above and below the stations carrier frequency, known as sideband. It is called multiplexing. Multiplexing is one of the most common use of FM which is use to disseminate separate signals for the left and right channel to broadcast in stereo.

2.2.2 AM & FM TRANSMISSION

AM and FM are two methods of transmitting information through radio signals. In both methods, the carrier wave is modified to transmit data, information, or sound.

AMPLITUDE MODULATION (AM)

AM is a method of transmitting radio signals. It dates back to the 1870s when it was discovered that information in the form of audio production could be transmitted over long distances via radio waves.

As the name suggests, in AM, the amplitude of the carrier wave is modified to transmit the input or information signal. The amplitude varies according to the input signal, e.g. When the amplitude of the input signal decreases, the amplitude of the carrier wave also decreases, and vice versa. The receiver of the signal is connected to a demodulator that monitors the change in amplitude and recreates the information accordingly.

1. The amplitude of the carrier wave is modified to send data or information.
2. It operates in a frequency range of 535 to 1705 kHz (KHz).
3. It has two sidebands.
4. In this method, frequency and phase remain the same.
5. Its modulation index varies from 0 to 1.
6. It can transmit over long distances, has a large range.

7. It is more sensitive to noise, it has poor sound quality.
8. It is more prone to indicating deformity and deterioration.
9. In AM, if two or more signals are received at the same frequency, both are demodulated which causes interference.
10. This is a less expensive way.
11. It requires less bandwidth in the range of 10 kHz.
12. It operates in medium frequency (MF) and high frequency (HF).
13. The received signal is of low quality.

FREQUENCY MODULATION (FM)

FM is another, which is a relatively advanced method of transmitting information through radio waves. It was invented by Edwin Howard Armstrong in the 1930s. In FM, the frequency of the carrier wave is modified according to the input signal to send information, e.g. The instantaneous frequency of the carrier wave increases when the amplitude of the carrier wave increases, and vice versa.

1. The frequency of the carrier wave is modified to send data or information.
2. It works in the frequency range of 88 to 108 MHz (MHz).
3. It has an infinite number of sidebands.
4. The amplitude and phase remain the same.
5. Its modulation index is always more than one.
6. It cannot transmit over long distances, there is a short range.
7. It is less sensitive to noise, it has better sound quality.
8. This reduces the signs of deformation and deterioration.
9. In FM, if two or more signals are received at the same frequency, the receiver captures the stronger signal and eliminates the weaker one.
10. It is more expensive than AM.
11. It requires high bandwidth in the range of 200 kHz.

12. It operates in the upper VHF and UHF range, where the noise effect is minimal.

13. The received signal is of high quality.

2.2.3 SATELLITE TRANSMISSION

The satellite is an object that rotates around a planet in a circular or elliptical path. Satellites serve many purposes, including data communication, scientific applications, and climate analysis. Satellite transmission requires an unobstructed line of sight. The line of sight will be between the satellite's orbit and a station on Earth. Satellite signals must travel in a straight line, but terrestrial wireless transmissions, like the curvature of the Earth, have no limitations.

Microwave signals from a satellite can be transmitted anywhere on Earth, which means that high-quality communications can be made available in remote areas of the world without the need for large-scale investments in ground equipment.

Satellites used for television signals are usually in a geo-stationary orbit 37,000 Km (about 23,000 miles) from the Earth's equator.

Satellite television, like other communications transmitted by satellite, begins with a transmitting antenna located in an uplink facility. Uplink satellite dishes are very large, having a diameter of 9 to 12 meters (approximately 30 feet to 40 feet). Increasing the diameter results in a more accurate orientation and increases the signal strength to the satellite. The uplink dish points to a specific satellite, and the uplink signals are transmitted within a specific frequency range, so that one of the transponders can receive it abroad according to the range of that satellite. Transponder ‘retransmits’ the signals back to Earth but in a different frequency band (to avoid interference with the uplink signal). The footer of the signal path from the satellite to the receiving earth station is called the downlink.

Essentially, programs are created by television channels / networks or purchased from content providers / software producers and uplinked to a satellite transponder that downlinks the program to the receiver. The downlink process of receiving and delivering programs has evolved over the years. In India, in the early years of transmission, only terrestrial transmission systems were available. It only revolutionized acquiring technologies in the 1990s. Today, many options are available in the market and receivers can choose between these technologies independently. Each transmission technique has its advantages and disadvantages. The receiver chooses what is best for them.

ADVANTAGES OF SATELLITE TRANSMISSION

1. The coverage area of a satellite is much higher than the terrestrial system.
2. The cost of transmitting a satellite is independent of the distance from the center of the coverage area.
3. Satellite-to-satellite communication is very accurate.
4. High bandwidths are available for use.

2.2.4 CABLE TV TRANSMISSION

Cable television is a system of providing television and other services to consumers via signals transmitted directly to people's televisions through fixed coaxial cables as opposed to the over-the-air method used in traditional television broadcasting in which a television antenna is required.

The cable operator not only provides pre-recorded programs, but also offers various television channels that are accessed through satellite dishes and a host of encoding and decoding equipment.

Cable and satellite transmission involves the earth station of satellite television channels, a satellite, multiple system operators (MSO) and small cable operators (SCO).

Satellite television channels (eg Sony, Zee TV, Sun TV and ETV) uplink their programs to the satellite. The satellite downlinks the programme onto the satellite dish of an MSO. The MSO in turn uses decoders to decrypt the transmitted images. It then supplies the signal via coaxial cable to individual subscribers or small cable operators, who in turn use signal amplifiers to supply the signal to individual subscribers.

While some channels are free-to-air (FTA), some are pay channels. Free to air means that the channel provider does not encrypt the channels and that anyone could receive the signal. However, free to view means that the channel provider encrypts the channel, but the MSO would have to decode the signal using a card to provide the signals to the subscriber. The channel may or may not charge the MSO (which in turn charges the subscriber). Pay channels are those that the subscriber has to pay to see. For example, Doordarshan is a free-to-air, free-to-view channel. Zee TV, Sony and Star Plus, etc. are pay channels. We need to pay a certain amount to watch a bouquet to channels.

2.2.5 CONDITIONAL ACCESS SYSTEM (CAS)

At a time when cable operators began to charge arbitrarily (although television networks continue to complain that they do not receive operator fees as they should), the conditional access system (CAS) was a solution. In cable and satellite mode, subscribers are forced to receive signals from TV channels that they would not want to watch. Also, the bouquetting system meant that subscribers would have to pay for channels that they would not see at all. Therefore, CAS was promoted as a solution to this problem. As its name suggests, CAS ideally allows subscribers to choose, subscribe, and access the channels they want to watch.

Conditional access is a technology for authorized users to control access to television services by encrypting broadcast programming. It was first developed in France. The CAS provider provides equipment and software to the station, which then integrates the CAS into its equipment.

A CAS consists of a set-top box (STB), a Subscriber Management System (SMS), and a Subscriber Authorization System (SAS). As the name itself suggests, SMS manages customer information as a smart card (similar to a bank's ATM card). The broadcaster uplinks satellite programs, which are downlinks to MSOs. The MSO then sends the signal to the subscriber. SAS gives the subscriber the right to decide which channel to access the signal. The STB filters the transmitted signals and checks whether the subscriber has subscribed to watch the channel. The programs communicated to the STB by the service provider in encrypted form are decrypted in real time using SAS and SMS, and then delivered to the television set.

The receiver receives an encrypted video signal. The data flows to the STB, which contains the circuit required to decode the video signal. The conditional access module verifies the existence of a smart card that contains the customer authorization code. If the authorization code is accepted, the conditional access module decrypts the data and returns it to the receiver. The receiver then decodes the data and sends it to view, if the code is not accepted, the data remains encrypted, restricting access.

2.2.6 DIRECT TO HOME (DTH)

Even before CAS became a reality, direct-to-home (DTH) technology has made its presence in India and is rapidly catching up. Doordarshan (DD Direct Plus) was the first to offer DTH services in India. Generally, DTH services are charged heavily worldwide, but DD decided to give it free, perhaps to capture the market first. Private DTH service providers are entering the market at a rapid pace and very soon there will be stiff competition among providers.

Direct-to-home satellite television (DTH) is becoming a reason in the satellite broadcasting industry, due to the fact that DTH offers immense opportunities for both broadcasters and viewers. Due to the rapid development of digital technology, DTH broadcast operators have been able to introduce a large number of new interactive applications to the television market worldwide, in addition to a large number of entertainment programs on a single distribution platform. Furthermore, since digital technology allows highly efficient exploitation of the frequency spectrum, the number of television channels that can be transmitted using digital technology is much greater than that transmitted using analogue technology. The increased number of television channels enables operators to satisfy the demand of many niche markets with dedicated broadcasts.

In general, DTH service is one in which a large number of channels are digitally compressed, encrypted and from very high power satellites. Programs can be obtained directly at home. This method of reception facilitates the use of small receiver dish antennas ranging from 45 to 60 cm, which are easily installed in individual buildings, do not require elaborate foundations / locations etc. Furthermore, the DTH transmission is fully Terminates local cable operations. As an individual user directly connected to service providers. However, a digital receiver is required to receive multiplex signals and view them on the TV. DTH, in sharp contrast to cable TV, lends itself to easy monitoring and control.

Ku-band transmission is widely used for this purpose. All encoded transmission signals are digital, providing higher resolution picture quality and better audio than traditional analogue signals. All the advantages of digital transmission, applicable to terrestrial transmission, are also relevant for satellite transmission.

DTH is an encrypted transmission that reaches the consumer directly via satellite. The DTH transmission is received directly to the consumer through a small satellite dish. The encrypted transmission is decoded by the STB as opposed to a normal cable connection.

DTH is also nothing more than a form of CAS, the only difference is that CAS is still delivered via the ground infrastructure, while DTH travels via satellite. DTH basically eliminates MSO and SCO. Both modes of signal delivery have co-existed worldwide and have grown. As against CAS, DTH is more flexible because STB and antenna can be carried anywhere. In the case of CAS, STBs must be changed every time we move to another city.

The basic components of DTH service are an STB and a dish antenna. Where an entry level DTH STB will cost in the region of Rs. 4,000, a high-end STB with value-added features such as personal video recorder (PVR), gaming console, channel management system, etc. will be in the region of Rs 10,000. PVR is a device that allows us to record programs on a hard disk and view them later at leisure. Whether we will be able to watch most channels including niche channels will depend on how much the service provider charges us for television channels and value-added services. DTH aims to be a neutral delivery platform for all. For multiple connections within the same premises, we can use the same connection, but each TV set must have different STBs.

The smart cards that come with STBs contain information about the channels subscribers have subscribed to. When inserted into the STB, it allows the subscriber to select the channels. Each customer receives a unique identification number that allows access to the signals.

DTH offers better picture quality than cable television. This is because, despite digital transmission and reception, cable transmission remains analogue. DTH provides stereophonic sound effects. It can also reach remote areas where terrestrial transmission and cable television have been unable to penetrate. In addition to improved picture quality, DTH also enables interactive TV services such as movies-on-demand, Internet access, video conferencing, and email.

Broadcasting organizations (television channels and networks) are pushing to obtain DTH, since the payment will be made by the client who offers the service directly to the client. A major problem facing broadcasters in India is the problem of under-reporting of subscribers by cable operators. SCOs benefit from showing fewer homes, and indeed cross-checking, MSOs and broadcasters don't make much of subscription fees and have to rely heavily on advertising revenue to cover their costs. It is not sustainable and does not offer high revenue growth for broadcasters.

The way out of this is to use an STB. This will provide clarity on how many households are actually using cable or going for DTH, whereby broadcasters directly connect to consumers and can actually reap revenues as the subscriber base grows.

The way out of this is to use an STB. This would provide clarity on the number of households that actually use cable or use DTH, allowing broadcasters to connect directly with consumers and receive income as the subscriber base grows.

2.2.7 DIGITAL TRANSMISSION

The transmission of signals that vary with time between two values of some physical quantity, one value represents the binary number 0 and the other represents1.

Digital signals use discrete values for the transmission of binary information over a communication medium such as a network cable or telecommunications link. On a serial transmission line, a digital signal is transmitted 1 bit at a time.

The opposite of digital transmission is analogue transmission, in which information is transmitted as a continuously changing volume.

Analogue and digital signals are used to transmit information, generally through electrical signals. In both techniques, information, like any audio or video, is converted into an electrical signal. The difference between analogue and digital technologies is that in analogue technology, information is translated into electrical pulses of varying amplitude. In digital technology, information is translated into binary (zero or one) format, where each bit is representative of two different dimensions.

ADVANTAGES OF ANALOGUE SIGNALS

1. Easy to processing.
2. Best suited for audio and video broadcasting.
3. It has low cost and is portable.
4. It has a very high density so that it can present more sophisticated information.
5. It is not necessary to buy a new graphics board.
6. Uses less bandwidth than digital sounds.
7. Provide a more accurate representation of a sound.
8. It is the natural form of a sound.

ADVANTAGES OF DIGITAL SIGNALS

1. Digital data can be easily compressed.
2. Any information can be digitally encrypted.

3. Devices that use digital signals are more common and less expensive.
4. The digital signal frees the device from observation errors such as parallax and approach errors.
5. Many editing tools are available.
6. You can edit the sound without changing the original copy.
7. Easy to transmit data through the network.

DISADVANTAGES OF ANALOGUE SIGNALS

1. Analogue has a lower quality signal than digital.
2. Cables are sensitive to external influences.
3. Analogue wire costs more and is not easily portable.
4. Low availability of models with digital interfaces.
5. Recording analogue sound on tape is quite expensive when damaged on tape.
6. It provides limitations in editing.
7. Tape is getting harder to find.
8. It is quite difficult to synchronize analogue sound.
9. Quality is easily lost.
10. Data may be corrupted.
11. Too many recording devices and formats that can be confusing to store a digital signal.
12. Digital sound can cut an analogue sound wave, which means that you cannot makeperfect reproduction of a sound.
13. Provides poor multi user interface.

DISADVANTAGES OF DIGITAL SIGNALS

1. Sampling can cause loss of information.
2. A / D and D / A require mixed signal hardware.
3. Processor speed is limited.
4. Develop quantification and rounding errors.
5. Requires more bandwidth.
6. The system and the processing are more complex.

DIFFERENCE BETWEEN ANALOGUE AND DIGITAL SIGNALS

SR. NO.	ANALOGUE SIGNALS	DIGITAL SIGNALS

1.	The analogue signal is a continuous signal that represents physical measurements.	Digital signals are time-separated signals that are generated using digital modulation.
2.	It uses a continuous range of values that help you represent information.	Digital signal uses discrete 0 and 1 to represent information.
3.	Temperature sensors, FM radio signals, Photocells, Light Sensor, Resistive touch screen are examples of Analogue signals.	Computers, CDs, DVDs are some examples of Digital signal.
4.	The analogue signal bandwidth is low.	The digital signal bandwidth is high.
5.	Analogue signals are deteriorated by noise throughout transmission as well as write/ read cycle.	Relatively a noise-immune system without deterioration during the transmission process and write/ read cycle.
6.	It is suited for audio and video transmission.	It is suited for computing and digital electronics.
7.	Analogue signal doesn't offer any fixed range.	Digital signal has a finite number, i.e., 0 and 1.

2.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

FILL IN THE BLANKS.

1. Sound is encoded in …….form onto a CD.
2. MSOs and SCOs deliver TV Signals to subscribers using a ……..cable.
3. CAS uses ……to manage subscriptions.
4. The first DTH service provider in India is ……..
5. The instrument that allows a subscriber to record programmes on DTH is called the ……..
6. The radio-frequency spectrum is a small part of the ……. spectrum.

7. DTH is an encrypted transmission that reaches the consumer directly via ……..
8. ……..offers better picture quality than cable television.
9. Digital signals use discrete values ……and ……..
10. Analogue has a ……. quality signal than digital.

2.4 SUMMARY

- It is a one-way wireless transmission over radio waves designed to reach a wider audience. This has the unique advantage of being available through low cost, battery powered, and portable sets even in rural areas.
- Radio broadcasting is done through AM and FM stations. There are several subtypes, namely commercial broadcasting, non-commercial educational (NCE) public broadcasting, and non-profit varieties, as well as community radio, student-run campus radio stations and hospital radio stations that can be found worldwide.
- Radio waves are a type of electromagnetic radiation, known for use in communication technologies, such as television, mobile phones, and radio. These devices receive radio waves and convert them into mechanical vibrations in the speaker to create sound waves.
- There are different ways that Electromagnetic waves are transmitted through the Earth's atmosphere. They are Sky Waves, Ground Waves and the Direct Waves.
- The satellite is an object that rotates around a planet in a circular or elliptical path. Satellites serve many purposes, including data communication, scientific applications, and climate analysis.
- Cable television is a system of providing television and other services to consumers via signals transmitted directly to people's televisions through fixed coaxial cables as opposed to the over-the-air method used in traditional television broadcasting in which a television antenna is required.

2.5 KEYWORDS

Amplification: Modification of signal magnitude from lower to higher levels causing an increase to a higher magnitude.

Amplitude: How high a wave is or how loud it is; higher the height of the wave, louder it is; also indicates how strong a sound is.

Clipping: Distortion or mutilation of audio signals due to overload.

Bandwidth: In computer networking refers to the data rate supported by a network connection or interface.

Conditional Access System (CAS): A TV signal receiving system wherein the subscriber can choose which channels to watch and pay for; an extension of the cable system; involves a set-top box.

Direct-to-home: A TV signal receiving system wherein the subscriber receives signals directly from a satellite to a small dish; also involves a set-top box.

Satellite and Cable: Signals coming from the satellite to the cable operator are distributed vis coaxial cables to individual subscribers.

2.6 SELF-ASSESEMENT TEST

1. What is the fundamental difference between analogue and digital signals?

2. What are the advantages and disadvantages of satellite and cable television?

3. What is CAS? In what manner is it an improvement over the satellite and cable system?

4. Explain the workings of DTH in detail.

2.7 ANSWERS TO CHECK YOUR PROGRESS

ANSWERS OF FILL IN THE BLANKS.

1. Digital
2. Coaxial
3. Subscriber Management System (SMS)
4. Doordarshan
5. Personal Video Recorder (PVR)
6. ElectromagneticSpectrum. (EM)
7. Satellite
8. DTH
9. 0 & 1
10. Lower

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SUBJECT: COMMUNICATIONS AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. DEEPAK NANDAL
LESSON NO.: 3	VETTER:PROF. DHARMINDER KUMAR
COMPUTER TECHNOLOGIES-1	

STRUCTURE

3.0 LEARNING OBJECTIVES

After reading this lesson you will be able to-

- **Learn the concept of computer system and study computerapplications.**
- **Discuss the concept of computernetworks.**
- **To learn the basics, uses and importance ofinternet.**
- **Learn the role and importance ofEmail.**
- **Discuss the role of computers in massmedia.**

3.1 INTRODUCTION

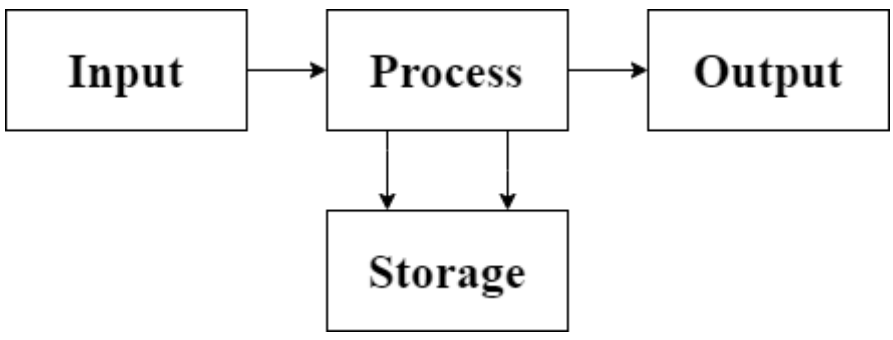
In todays, world computers are considered to be one of the necessities and used in one way

or other. Different fields of engineering, medicine and research uses computers appropriately, not only these fields but also in our daily life all are almost now a day are dependent on computer applications. Day to day computations, communications, banking, reservations,Emails, internet and even cars, games, washing machines etc. we use computers and hand- held devices. Now computers use the internet and provide mass communication, or exchange of information to most of us. Computers are used for communication with family and friends across the world via twitter, Facebook, Skype and so on. Gather information, learn something new, work from home, for entertainment purposes. All this is only possible because of computer's hardware, software, means of transmission, LAN, MAN, memory units and the use of internet.

Society can be defined as "a community, nation, or broad grouping of people having common traditions, institutions, and collective activities and interests. To understand the full impact of computers on society, we will first have to understand the meaning of 'computer'. Almost everything we know in today's society is either operated or made by computers. Cars and jets were designed on computers, traffic signals are operated by computers, most medical equipment use computers and even space exploration was started with computers. Most of the jobs today require the use of computers. It is clear that computer is really a tool for mass communication and to understand its applications in mass communication, firstly we need to understand what is a computer unit, internet, network transmission, and other fundaments of computer.

3.2 COMPUTER FUNDAMENTALS

Computer word is derived from the word Compute, and the dictionary meaning of compute is to calculate. But computer is way beyond that, it handles complex arithmetic computations, processes information and other tasks such as accepting, sorting, selection and updating of various kinds of data inputted by the user. In broader sense, digital



computer is represented by figure1.1.

Figure 1.1 Information Processing Cycle

3.2.1 COMPUTERBASICS

The set of instructions given to the computer to perform various operations is called as the computer program. The process of converting the input data into the required output form with the help of the computer program is called as data processing. The computers are therefore also referred to as data processors. The term **hardware** and **software** are almost everywhere is used withcomputer.

- **Hardware-** The hardware is the machinery itself. It is made up of the physical parts or devices of the computer system like the electronic Integrated Circuits (ICs), magnetic storage media and other mechanical devices like input devices, output devices etc.

- **Software-** The computer program is the one which controls the processing activities of the computer. The computer thus functions according to the instructions written in the program. Software is a collection of programs which utilize and enhancethecapability ofthehardware.Figure 1.2 further classified the basic parts of computer as:

  - InputUnit
  - Central ProcessingUnit
  - OutputUnit

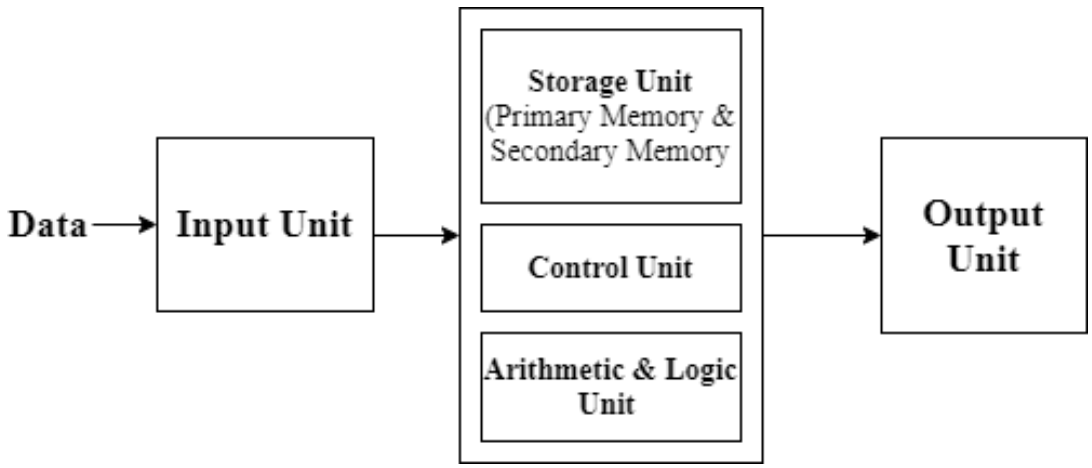


Figure 1.2 Components of Computer System

This central processing unit is considered as the brain of computer system, it mainly comprises of three parts:

- The Control Unit- The Control Unit controls the operations of the entire computer system. The control unit gets the instructions from the programs stored in primary storage unit interprets these instruction and subsequently directs the other units to execute theinstructions.

- The Arithmetic Unit- The Arithmetic Logic Unit (ALU) actually executes the instructions and performs all the calculations and decisions. The data is held in the primary storage unit and transferred to the ALU wheneverneeded.

- The Primary Storage Unit- Primary storage is also called as the main memory, as CPU only interacts with the primary memory and all the information that needs to be processed must be inserted firstly into the main memory. Before the actualprocessingstarts the data and the instructions fed to the computer through the input units are stored in this primary storage unit.

- The Secondary Storage- Secondary storage devices are storage devices that operate alongside the computer's primary storage, RAM, and cache memory. Secondary storage is for any amount of data, from a few megabytes to petabytes. These devices store almost all types of programs and applications. This can consist of items like the operating system, device drivers, applications, and user data. For example, internal secondary storage devices include the hard disk drive, the tape disk drive, and compact disk drive. Most of the secondary storage devices are internal to the computer such as the hard disk drive, the tape disk drive and even the compact disk drive and floppy disk drive.

GENERATIONS OF COMPUTER

In computer, the generations are considered as the change in technology that includes hardware and software as well. There are five generations known till date. The table 1

shows the generation of computers evolves bytime.

Table 1: Generations of Computers

Sr. No	Generation and Description
1.	**First Generation** The period of first generation: 1946-1959. Vacuum tubebased.
2.	**Second Generation** The period of second generation: 1959-1965. Transistor based.
3.	**Third Generation** The period of third generation: 1965-1971. Integrated Circuit based.
4.	**Fourth Generation** The period of fourth generation: 1971-1980. VLSI Microprocessor based. VLSI (Very Large Scale Integrated)
5.	**Fifth Generation** The period of fifth generation: 1980-onwards. ULSI microprocessor based. This generation also include Artificial Intelligence and Parallel Processing. ULSI (Ultra Large Scale Integrated)

CLASSIFICATION OF COMPUTERS

- **Analog Computers:** In analog computers, data is recognized as a continuous measurement of a physical property like voltage, speed, pressure etc. Readings on a dial or graphs are obtained as the output, ex. Voltage, temperature; pressure can be measured in thisway.

- **Digital Computers** These are high speed and programmable devices. Digital Computers are further classified as General Purpose Digital Computers and Special Purpose Digital Computers. General Purpose computers can be used for any applications like accounts, payroll, data processing etc. Special purpose computers are used for a specific job like those used in automobiles, microwaves etc. This classification can also be based on memory and computation speed suchas:

  - Small Computers- PC's, Notebooks,Laptops.
  - Hand Held Computers
  - MainframeComputers

- SuperComputers

3.2.2 COMPUTER NETWORKS (LAN,WAN, MAN)

Computer Networks forms the basis of communication in the terms of information technology. A network is defined as a set of devices often denoted as nodes connected by communication likes. Whereas the node represents a computer, printer or any other device that is capable of sending or receiving information/ data. Networks are used for communication using emails, live-video sharing, instant messaging and other many methods. Second major objective of networks is to share devices between different set of users, and allowing network users to easily access and maintaininformation.

TYPES OF NETWORK

- LAN (Local AreaNetwork)
- WAN (Wide AreaNetwork)
- MAN (Metropolitan AreaNetwork)

LAN - A local area network or LAN is a network that connects computers within a limited area. This might be in a school, an office or even a home. Generally LANs, are privately- owned networks within a single building or campus of up to a few kilometersinsize. Theyare widely used to connect personal computers and workstations in company offices and factories to share resources (e.g., printers) and exchange information. LANs are distinguished from other kinds of networks by three characteristics:

- Size
- TransmissionTechnology
- Topology

Nodes in a LAN are linked together with a certain topology. These topologies include: BUS, RING and STAR Topology.

WAN- A wide area network, or WAN, spans a large geographical area, often a country or continent. It is a network that covers a larger geographical area, usually with a radius of more than a kilometer. It contains a collection of machines intended for running user (i.e., application) programs. These machines are called as hosts. The hosts are connected

by a communication subnet, or just subnet for short. The hosts are owned by the customers (e.g., people's personal computers), whereas the communication subnet is typically owned and operated by a telephone company or Internet service provider. The job of the subnet is to carry messages from host to host**,** just as the telephone system carries words from speaker to listener. Figure 1.3 shows both LAN and WAN, how these two networks lookslike.

In essence, this mode of telecommunication permits a business to effectively perform its daily performs no matter location. The net is also thought of a WAN. Related terms for alternative kinds of networks are personal area networks (PANs), local area networks (LANs), campus area networks (CANs), or metropolitan area networks (MANs) that are sometimes restricted to an area, building, field or specific metropolitan arearespectively.

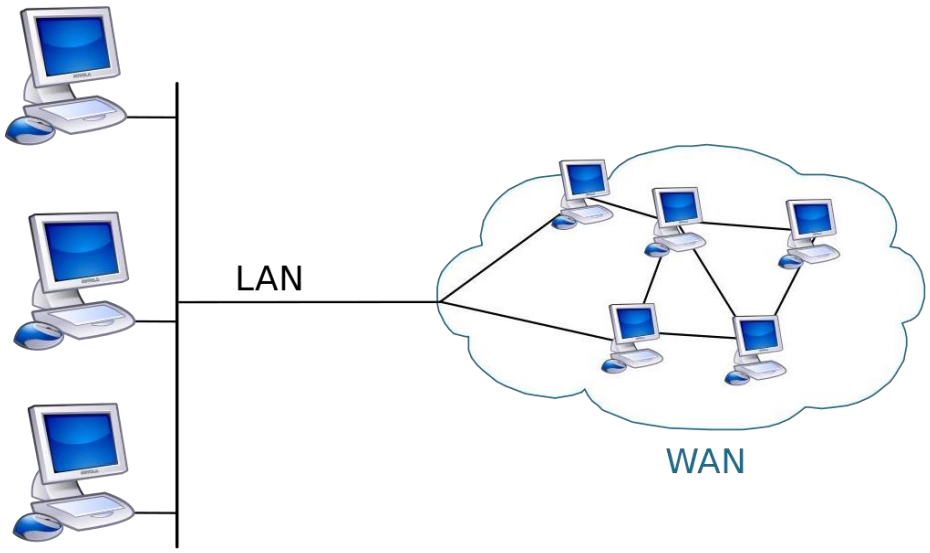


Figure 1.3 LAN and WAN

MAN- A metropolitan space network (MAN) could be a network that interconnects users with pc resources in an exceedingly geographic space or region larger than that lined by even an oversized local area network (LAN) however smaller than the realm lined by a wide area network (WAN). The term is applied to the interconnection of networks in an exceedingly town into one larger network (which might then conjointly provide economical affiliation to a large space network). It's conjointly accustomed mean the interconnection of many native space networks by bridging them with backbone lines. The latter usage is additionally generally mentioned as a fieldnetwork.

3.2.3 ROLE OF INTERNET

Network provide the ability to interact and share information between the computers and because of this only we have internet. Internet is often called as the network of networks. A corporate network may have its computers connected through a local area network, governedby certain rules. Further, this network may be connected with other networks. But, if different networks are governed by different rules, will they be able to communicate with one another? Imagine a group of people having one Tamilian, one Bengali, one Himachali, one Mizo and one from Maharashtra trying to communicate with each other in their own native languages, failing to understand what the other person is trying to say. Therefore, to communicate with each other, some common standard must be followed.

In order to work with the Internet we need to know certain related terms like www, web browsers, web pages, websites, etc. We should know how to get connected to the Internet.

- **WWW-** WWW stands for World Wide Web. A technical definition of the World Wide Web is "all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP). It is a way of exchanging information between computers on the internet, tying them together into a vast collection of interactive multimedia resources".

- **Web Browsers-** It is a software application used to locate, retrieve and display content on the World Wide Web, including webpages, images, video and other files. As a client/server model, the browser is the client run on a computer or mobile device that contacts the Web server and requests information. The web server sends the information back to the browser which displays the results on the Internet-enabled device that supports a browser. Examples are chrome, firefox, Microsoft explorer and others.

- **Web Pages-** It is a document available on World Wide Web. Web Pages are stored on web server and can be viewed using a web browser. A web page can contain huge information including text, graphics, audio, video and hyperlinks.

These hyperlinks are the link to other web pages. Web pages can either be static or dynamic. Static pages show the same content each time they are viewed. Dynamic pages havecontentthat can change each time they are accessed. These pages are typically written in scripting languages such as PHP, Perl, ASP, or JSP. The scripts in the pages run functions on the server that return things like the date and time, and database information. All the information is returned as HTML code, so when the page gets to your browser, all the browser has to do is translate the HTML.

- **WebSite-** A Web site is a collection of pages. A Web page is an individual HTML document. This is a good distinction to know, as most techies have little tolerance for people who mix up the two terms. A website refers to a central location that contains more than one web page or a series of web pages. For example, www.gjust.org is considered a website, which contains thousands of different web pages, including the page you're readingnow.

Today the Internet is the most powerful tool in the world. The Internet is a collection of various services and resources. However, like every single innovation in science and technology, Internet has its own advantages and disadvantages. Internet has played an important part in our daily life, and in fact, it brings us lots of advantages, and the first I want to mention is communication. The foremost target of Internet has always been the communication. Now thanks to the Internet, we can communicate in a fraction of second with a person who is sitting in the other part of the world. Today for better communication, we can avail the facilities of e-mail, we can chat for hours with our friends. With the help of such services, it has become very easy to establish a kind of global friendship where you can explore other cultures of different countries.

Besides, information is the biggest advantage internet is offering. The Internet is a virtual treasure of information. Any kind of information on any topic is available on the Internet,andyoucanalmostfindanytypeofdataonalmostany kindofsubjectthatyouarelooking for. There is a huge amount of information ranging from government law and services to market information, new ideas and technical support. It is very useful for students who usually have to gather information to do theirhomework.

Entertainment is another popular reason explaining why many people prefer to surf the Internet. Downloading games and songs, visiting chat rooms or just surfing the web are some of the pleasures people have discovered. When people surf the web, there are numerous things that can be found. Music, hobbies, news and more can be found and shared on the Internet. Apart from those advantages, Internet also has some disadvantages, and one of which is harmful sites. This is perhaps the biggest threat to people's healthy mentallives.

3.2.4 E-MAIL

E-mail or Electronic mail is considered as one of the premier uses of Internet. It is a flexible and handy tool of communication via the electronic medium. Its most attractive features are: speed, portability and versatility. Email is a system of global communication in which the user can compose a message in his or her account and send it to person/s possessing email accounts. It is an exchange of information among online service provider users. The message sent can be regenerated at the receiver's email account within seconds. Over the years, a number of tools of electronic communication such as Facebook, Twitter, blogs etc. have emerged yet email has retained its charm and will continue to do so in the future. Due to its unique features and adaptability, it lends itself to a number of uses. The advancement of technology and the flooding of smart internet enabled phones, in present times, checking, sending and receiving emails is not only restricted to PC or laptops but it can be accessed on the cell - phones also making email communication accessible at all times. Email communication is used in almost all aspects of human interaction. It is used for formal as well as informal communication. You can send up to 25 MB in attachments. If you have more than one attachment, they can't add up to more than 25 MB. If your file is greater than 25 MB, Gmail automatically adds a Google Drive link in the email instead of including it as an attachment. Itis used for interaction in marketing, news,academics,broking etc. along with large number of other areas. Some of the major advantages of E-mail are-

- **Productivity tools:** Email is usually packaged with a calendar, address book, instant messaging, and more for convenience andproductivity.
- **Access to web services:** If you want to sign up for an account like Facebook or order products from services like Amazon, you will need an email address so

you can be safely identified andcontacted.

- **Easy mail management:** Email service providers have tools that allow you to file, label, prioritize, find, group, and filter your emails for easy management. You can even easily control spam, or junkemail.

- **Privacy:** Your email is delivered to your own personal and private account with a password required to access and viewemails.

- **Communication with multiple people:** You can send an email to multiple people at once, giving you the option to include as few as or as many people as you want in a conversation.

- **Accessibleanywhereatanytime:**Youdon'thavetobeathometogetyourmail. You can access it from any computer or mobile device that has an Internet connection.

HOW E-MAIL WORKS ON THE INTERNET

Like a postal address, an e-mail address specifies the destination of an electronic message. An Internet e-mail address looks like this: user name@domain name. The user name is a unique name that identifies the recipient. The domain name is the address. Many people can share the same domain name. E-mail is sent and received through electronic "post offices' known as mail servers. To read e-mail, one must retrieve it from the mail server. If the message doesn't reach its destination the first time, the mail server sends it again.

- **To** contains the e-mail addresses of the recipients. This is a mandatoryentry
- **CC,** short form of Carbon Copy, this is optional.
- **BCC,** Short form of Blind Carbon Copy, contains the e-mail addresses of other recipients who receive copies, but their names and addresses are hidden from the other recipients. This isoptional.
- **Subject** contains the main topic of the message. Keep this brief. Recipients see this in their summary of incominge-mails.
- **Attachment** contains the names of files that you may be sending, for example, a word-processing document or aspreadsheet.

- **Body** contains the messageitself.
- E-mail can include a **signature** at the end of the message. An e-mail signature is not your hand-writtensignature.

3.3 ROLE OF COMPUTER IN MASS COMMUNICATION

Mass Communication: Decades ago, computers were large, clunky machines that were unable to do much. Even simple calculations (by today's computing standards) would take computers the size of closets a long time to complete. Oh, and forget about using those original computers to play video games, browse the web, or send an email. Things are very different today. Now computers use the internet and provide mass communication, or the exchange of information on a large scale. Today, this means communication across the entire world at the speed of light. The conventional mass media has been replaced by up to date most complicated and most sophisticated. Along with this technological advancement media industry growing fast and rapid. Information revolution had made the information process speedy and rapid, news and information can be sent in a flash to any corner of theworld.

COMPUTERS IN MASS COMMUNICATION

Today in this age of information technology the use of computer is the part media industry (Print, Broadcast, Electronic and Advertising Agency, News Agency and Films). Composing, printing, animation, diagrams, audio, video visuals, large data storage and centralized newspapers, magazines publishing is only possible through this advance system. Online newspaper editions are also possible through this rapid technology.

1. The used of computerized systems has meant the down of the electronic newsroom, with news editors checking reporters files on the screen, sending back stories where coverage is not sufficient or has failed in some way, and routing stories to the copy- taster and the subeditors as they becomeready.

2. News websites and news blogs give numerous ways to stay connected and up-to-date. The publications join Twitter and make a Facebook page to get the support of the demographic that no longer reads print news. However, maybe the best source of news comes from retweets and from audiencereporting.

3. Without computer now film industry is zero. Helps to make the film more effective than the traditional. Edits can be made through a mouse click. We use compute for special effects like Editing, Graphics, Animation andDistribution

4. Computers make it possible for reporters to cover stories that were simply impossible to write in simpler times. It would take several reporters several lifetimes to do the data analysis to done on computers.

5. Photo setting was made possible by the computer but it owed its utilization to the web-offset printingprocess.

6. For years, publishers of newspapers, magazine and other print products have been fascinated with the idea of delivering information electronically. In contrasttoconventional printing on paper, delivery by computer and other means seemed to offer several benefits both the producer andconsumer.

7. Computer is used in medics; Patient monitoring, patient records, diagnosis, hospital administration, medical history records and life supportsystem.

8. Advertisers-use computers to create the layout their client wants for a certainproject.Ad Agencies-use computers to present the finished work to their clients and re-touch anything the client may want changed.

9. Suppliers-may use computers to make spreadsheets of the items they have sold or are selling. Media-use computers to distribute their ads whether in newspapers, magazines, or TVstations.

10. Graphic Designers use high tech creative programs in order to create a specific add for their client. The client is able to make changes to the design with the computer programs.

11. Computer Generated Graphics-are used for TV commercials and help reach a specialized market, such as children to help show things they might not otherwise understand. As you can see, computers help the world of advertising out in a big way. Whether it is writing scripts, sending emails, or designing ads computers can

be used for a lot. Without the use of a computer, advertisers would be sent back to the drawing boards.

3.4 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

FILL IN THE BLANKS

1. Personal Computers are also calledas……
2. The primary storage unit is also calledas……
3. Arithmeticlogic unit is a partof……
4. Web pages are written in whichlanguage……
5. CC is used for……and BCC is usedfor…….

3.5 SUMMARY

The lesson starts with the fundaments of the computer that elaborates the basics assembly of computer. How a computer works? A computer is a machine composed of hardware and software components. A computer receives data through an input unit based on the instructions it is given and after it processes the data, it sends it back through an output device. The user provides the input to the machine and the CPU processes that information to produce the output. Furtherit classifies the CPU portion, which consists of Primary memory, ALU and CU. The control unit of the CPU contains circuitry that uses electrical signals to direct the entire computer system to carry out, or execute, stored program instructions. Like an orchestra leader, the control unit does not execute program instructions; rather, it directs other parts of the system to do so. The control unit must communicate with both the arithmetic/logic unit and memory. Further the role of internet in mass communication is very important, for the same it is better to understand what is internet and how it works? Internet is the global system of interconnected computer networksthat uses theInternet protocol suite(TCP/IP) to link devices worldwide. It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast

range of information resources and services, such as the inter- linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and file sharing. The role of LAN and WAN is very important in establishment of internet. LAN is a group of network devices which allow the communication betweenconnecteddevices.Theprivateownershiphasthecontroloverthelocalareanetwork rather than public. LAN has short propagation delay than MAN as well as WAN. WAN covers the large area than LAN as well as MAN such as: Country/Continent etc. WAN is expensive and should or might not be owned by one organization. PSTN or Satellite medium are used for wide area network. This all sums up with the role of computer in mass communication, the WWW, Internet and email revolutionized the way individuals communicate with each other. Rather than waiting days or weeks to see information, we can now view all information at the speed of light. Email has fundamentally transformed how people share information and conduct business based on the speed and flexibility it offers. Computers can process data at approximately 20 million bytes per second so it is easy for them to download and instantly display almost any text email.

3.6 KEYWORDS

CC:CC stands for carbon copy which means that whose address appears after the CC header would receive a copy of the message. Also, the CC header would also appear inside the header of the receivedmessage.

BCC: It stands for blind carbon copy which is similar to that of Cc except that the Email address of the recipients specified in this field do not appear in the received message header and the recipients in the To or Cc fields will not know that a copy sent to these address.

Network Topology: Network topology refers to the physical or logical layout of a network. It defines the way different nodes are placed and interconnected with each other. Alternately, network topology may describe how the data is transferred between these nodes.

ALU: An arithmetic logic unit (ALU) is a digital circuit used to perform arithmetic and logic operations. It represents the fundamental building block of the central processing

unit (CPU) of a computer. Modern CPUs contain very powerful and complex ALUs. In addition to ALUs, modern CPUs contain a control unit(CU).

Primary Memory: Primary memory is computer memory that is accessed directly by the CPU. This includes several types of memory, such as the processor cache and system ROM. However, in most cases, primary memory refers to system RAM

3.7 SELF-ASSESEMENT TEST

1. List and explain in brief the characteristics ofcomputers.
2. What is internet and how itworks?
3. Explain Computer Networks? What are the different types of CN, also briefly discuss topologies.
4. Discuss briefly the role of E-mail in masscommunication.
5. What is the role of mass communication insociety?
6. How internet helps in masscommunication?

3.8 ANSWERS TO CHECK YOUR PROGRESS

1. DesktopComputers
2. Mainmemory
3. CPU
4. HTML
5. Carbon copy and Black carboncopy

3.9 REFERENCE SUGGESTED/READINGS

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SUBJECT: COMMUNICATIONS AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. DEEPAK NANDAL
LESSON NO.: 4	VETTER: PROF. DHARMINDER KUMAR
COMPUTER TECHNOLOGIES-II	

STRUCTURE

4.0 LEARNING OBJECTIVES

After reading this lesson you will be able to:

- **Learn about importance of technologies in mass communicatios.**
- **Learn and discuss technologies such as facsimilie, videotext and teletext.**
- **Discuss the role and meaning of multimedia.**
- **Discuss web technologies such as website, webpages.**
- **Learn things about the protocols used in webtechnologies.**

4.1 INTRODUCTION

The "Internet and digital media age" began in 1990 and continues today. Whereas media used to be defined by their delivery systems, digital media are all similarly constructed with digital, binary code made up of ones and zeros. Instead of paper being the medium for books, radio waves being the medium for sound broadcasting, and cables being the medium for cable television, a person can now read a book, listen to the radio, and access many cable television shows on the Internet. In short, digital media read, write, and store data (text, images, sound, and video) using numerical code, which revolutionized media more quickly than ever before.

Just as technological advances made radio and television possible, the Internet would not have been possible without some key breakthroughs. The Internet is a decentralized communications and information network that relies on the transmission of digital signals through cables, phone lines, and satellites, which are then relayed through network servers, modems, and computer processors. The development of digital code was the first innovation that made way for the Internet and all digital media. Surprisingly, this innovation occurred in the 1940s, leading to the development of the first computers. Second, in 1971, microprocessors capable of reading and storing electronic signals helped make the room-sized computers of the past much smaller and more affordable for individuals. Last, the development of fiber-optic cables in the mid-1980s allowed for the transmission of large amounts of information, including video and sound, using lasers to create pulses of light. These cables began to replace the copper cables used by telephone, television, cable, and satellite companies. Because of these advances, information now travels all around us in the form of light pulses representing digits (digital code) instead of the old electrical pulses.

The birth of the Internet can be traced back to when government scientists were tasked with creating a means of sharing information over a network that could not be interrupted, accidentally or intentionally. More than thirty years ago, those government scientists created an Internet that was much different from what we think of as the Internet today. The original Internet was used as a means of sharing information among researchers, educators, and government officials. That remained its main purpose until the Cold War began to fade and the closely guarded information network was opened up to others. At this time, only a small group of computer enthusiasts and amateur hackers made use of the Internet, because it was still not accessible to most people. Some more technological advances had to occur for the Internet to become the mass medium that it is today.

The main problem was that there wasn't a common language that all computers could recognize and use to communicate and connect. He solved this problem with the creation of the hypertext transfer protocol (HTTP), which allows people to make electronic connections or links to information on other computers or servers. He also invented hypertext markup language (HTML), which gave users a common language with which to create and design online content. I actually remember learning HTML code and creating my first (very simple by today's standards) website in 1996. Learning HTML code wasn't something that the masses were going to rush to do, but new software programs and webpage building programs emerged that allowed people to build web content without having to know the code. As if inventing HTTP and HTML wasn't enough, Berners-Lee also invented the first browser, which allowed people to search out information and navigate the growing number of interconnections among computers. JavaScript is a client-side scripting language developed by Brendan Eich. JavaScript can be run on any operating systems and almost all web browsers. You need a text editor to write JavaScript code and a browser to display your web page.The programs in this language are called scripts. They can be written right in a web page's HTML and run automatically as the page loads. Scripts are provided and executed as plain text. They don't need special preparation or compilation to run. In this aspect, JavaScript is very different from another language called Java.

From the beginning, the Internet was a mass medium like none other. The majority of the content was user generated and the programs needed to create and navigate online content were in the public domain. This fusing of free access to information and user creativity still forms the basis of digital "new media" that are much more user controlled and personal. Demand for Internet access and more user-friendly programs created the consumer side of the net, and old media companies and regular people saw the web as another revenue generator.

4.2 TECHNOLOGIES FOR MASS-COMMUNICATION

The evolution of means of communication witnessed a substantive boost in the past two hundred years. The pace of invention has accelerated from one every fifty years or so in the eighteenth century to several per year at the dawn of the twenty-first century. The decisive turn was taken during the second half of the nineteenth century, when a flurry of technical inventions changed the communication landscape. By the late nineteenth century, important inventions had already been made public: the telegraph, the telephone, the motion picture camera, and the motion picture projector were among the most prominent information and

media technologies to emerge. Perhaps more important was the invention of electricity, which would become the bloodline of the information revolution. These early inventions created the conditions that made the process of mass communication possible; equally important is the fact that these inventions established the early foundations for the current global communication system. As already stated, the development of digital code, microprocessors, and fiber-optic cables were key technological advances that made the Internet and digital communication possible. Rapid developments around 1990, such as the creation of HTTP and HTML coding and Internet browsers, created what we know today as the World Wide Web.

4.2.1 FACSIMILE

A facsimile or fax for short is a electronic machine. A fax machine contains a photo electronic cell which scans an image and converts the black, grey and white into electronic signal and so modulates the telephone carrier wave. The fax machine will also act as a receiver, able to decode incoming signals and print them as images on special paper. The original document is scanned with a fax machine, which treats the contents (text or images) as a single fixed graphic image, converting it into a bitmap. In this digital form, the information is transmitted as electrical signals through the telephone system. The receiving fax machine reconverts the coded image and prints a paper copy of the document.

Almost all modems manufactured today are capable of sending and receiving fax data. Fax/modem software generates fax signals directly from disk files or the screen. Even if a document is text only, it is treated by the computer as a scanned image and is transmitted to the receiver as a bitmap. Faxing a message online works well if the recipient wants only to read the message. However, if the document requires editing, it must be converted into ASCII text by an OCR (optical character recognition) program, or it must be retyped manually into the computer. A more efficient method of sending documents that require modification is through the e-mail system. E-mail files are already ASCII text so they can be edited immediately in any text editor or word processing program.

4.2.2 VIDEOTEXT

Meaning of videotext- An electronic data retrieval system in which usually textual information is transmitted via telephone or cable-television lines and displayed on a television set or video display terminal especially : such a system that is interactive — compare teletext.

Video is a great way to break up the monotony of your communications with active, dynamic content. Emojis, GIFs, and photos are also great ways to do that, but they're just an appetizer.

Videotext and videotex are interchangeable terms, and can be used for the same. videotex systems were menu-driven systems designed for display on television sets. Videotex information included news, weather, local information, and services such as bus schedules and entertainment event listings. Many large media firms implemented videotex systems in the United States, and several countries (notably England, Canada, and France) invested large amounts of money in the technology.

4.2.3 TELETEXT

TELETEXT is a one-way, or non-interactive, system for transmission of text and graphics via broadcasting or cable for display on a television set. A decoder or microchip resident in the TV set is needed to extract the teletext information. Teletext can be transmitted over one-way cable or over-the-air broadcasting via radio or television. In the case of TV, it can occupy a full channel or be encoded in the vertical blanking interval, or VBI. If you've ever mistuned a TV set and noticed the wide, black line that appears between "frames," you've seen the VBI. Before the development of teletext, the VBI was an unused portion of the television broadcast.

Teletext can be liked to a sort of "Rolodex in the sky." It is a closed loop of pages of information that are transmitted one after the other, over and over again. The viewer uses an on-screen index or directory to choose the pages of information to be viewed. A page number is then entered and, after a slight delay, the page is displayed on the television screen. Although teletext may appear to the viewer to be interactive, it is not. When one punches in a page number on a teletext decoder, the machine simply waits for that page to be broadcast, captures it and displays it on the television set. The delay varies depending on the number of "frames" in the teletext "loop" or set, but it generally averages 5 to 30 seconds.

- Usually about 100-150 frames in a series, sometimes with 2 or 3 frames to a page.
- Service limited to a few hundred pages to make delays tolerable to viewers.
- User selects subsections from the main menu using a hand-held keypad similar to a TV remote control.
- Access time for a particular frame can be up to 30 seconds, a key factor.

- Many believe teletext has the best potential to become a mass medium because of the almost universal presence of television sets in many nations.

4.2.4 MULTIMEDIA

Multimedia is the use of a computer to present and combine text, graphics, audio, and video with links and tools that let the user navigate, interact, create, and communicate. This definition contains four components essential to multimedia. First, there must be a computer to coordinate what you see and hear, and to interact with. Second, there must be links that connect the information. Third, there must be navigational tools that let you traverse the web of connected information. Finally, because multimedia is not a spectator sport, there must be ways for you to gather, process, and communicate your own information and ideas. If one of these components is missing, you do not have multimedia. For example, if you have no computer to provide interactivity, you have mixed media, not multimedia. If there are no links to provide a sense of structure and dimension, you have a bookshelf, not multimedia. If there are no navigational tools to let you decide the course of action, you have a movie, not multimedia. If you cannot create and contribute your own ideas, you have a television, not multimedia.

Types of Multimedia

There are certain types of media used in multimedia presentations, from simple to complex visual and audio devices. Multimedia components are divided into:

- **Text**- This refers to written documents, the words seen in handouts, powerpoint presentations, Web sites, and reports. One of the most simple types of media, text is also used to communicate the most information and appears in conjunction with visual aids.
- **Audio**- This is the sounds that often accompany visual presentations. Sound by itself can be used in radio broadcasts or online audio files, but in multimedia presentations audio is used as a complementary media. Sound effects can help make a presentation more memorable, while hearing the main points of information spoken can help listeners focus.
- **Still images**- Photographs, taken either by digital or analog means, are an important part of multimedia productions. Well-placed visual aids can explain concepts with clarity.
- **Animation**- Animations are graphics that move, accompanied by audio effects.

- **Video**- Video media is used to spread interviews, create movies, and post personal updates to communicate business messages. Currently, businesses can use videos online or create CDs to spread for instructional use within their company.
- **Interactivity**- The newest form of multimedia, interactivity, is a computer-based tool which allows users to choose to learn different parts of information on their own terms. By highlighting or choosing links and sections, users can manipulate the information environment, examining whatever knowledge is important to them.

4.2.5 ANIMATION

Animation is the process of designing, drawing, making layouts and preparation of photographic sequences which are integrated in the multimedia and gaming products. Animation involves the exploitation and management of still images to generate the illusion of movement. A person who creates animations is called animator. He / she use various computer technologies to capture the still images and then to animate these in desired sequence. Animation is a method of photographing successive drawings, models, or even puppets, to create an illusion of movement in a sequence. Because our eyes can only retain an image for 1/16 of a second, when multiple images appear in fast succession, the brain blends them into a single moving image. In traditional animation, pictures are drawn or painted on transparent celluloid sheets to be photographed and shown on film. Early cartoons are examples of this, but today, most animation is made with computer-generated imagery or CGI.

To create the appearance of smooth motion from these drawn, painted, or computer-generated images, frame rate, or the number of consecutive images that are displayed each second, is considered. Moving characters are usually shot “on twos” which just means one image is shown for two frames, totaling in at 12 drawings per second. 12 frames per second allows for motion but may look choppy. In the film, a frame rate of 24 frames per second is often used for smooth motion animation. There are several types of animation that employ different techniques to achieve their desired effect.

Types of Animation

- Traditional Animation
- 2D Animation (Vector- based)

- 3D Animation
- Motion Graphics
- Slop Motion

4.3 WEB TECHNOLOGIES

Web technology refers to the means by which computers communicate with each other using markup languages and multimedia packages. It gives us a way to interact with hosted information, like websites. Web technology involves the use of hypertext markup language (HTML) and cascading style sheets (CSS). The methods by which computers communicate with each other through the use of markup languages and multimedia packages is known as web technology. In the past few decades, web technology has undergone a dramatic transition, from a few marked up web pages to the ability to do very specific work on a network without interruption.

The top web technologies are:

4.3.1 WEBSITE

A website is the group of web pages which are placed in a location on the internet under a domain. For example, a company website can have various web pages such as home, about us, contact us, products, services and other. It is accessible through a web address. The website can be designed using static web pages or dynamic web pages. Contents on a website are globally viewed, remains same for the different individuals.

A website can be industry-specific, product specific or services specific etc.; these websites are intended to educate their site visitors about their industry, products or services information. A website must be hosted on a server at first so that it can be accessed on the internet. In this sense, a website represents a centrally managed group of web pages, containing text, images and all types of multi-media files presented to the attention of the Internet users in an aesthetic and easily accessible way. All websites enabled through the Internet constitute the World Wide Web (WWW).

4.3.2 WEBPAGE

A web page can be defined as a solitary page of a website. When a user wants to access a webpage, it can be accessed by using a single URL, and that page can be copied and shared. Viewing a webpage doesn't require any navigation, unlike a website. It can contain text,

graphics, audio, video, downloadable hyperlink to other pages, etc. Web browsers are used to display the contents of the webpage through connecting to the server so that the remote files can be displayed. These are created by using a programming language such as HTML, PHP, Python and Perl etc. The HTML pages have a simple appearance and are not that interactive but consume less time to load and browse.

There are two types of web page – Static web page and dynamic webpage. In the static web page designing, when a product acquires any change in information, the change must reflect on the website. At that time, a person must incorporate the change on every web page manually, and this is time consuming and tiresome process. Where in the dynamic web page, a central database is used to store the product information. It is a document, commonly written in HTML, that is viewed in an Internet browser. A web page can be accessed by entering a URL address into a browser's address bar. A web page may contain text, graphics, and hyperlinks to other web pages and files. A web page is often used to provide information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers. Multiple web pages make up a website, like our Computer Hope website.

4.3.3HOMESITE

Homesite or homepage is a document, commonly written in HTML, that is viewed in an Internet browser. A web page can be accessed by entering a URL address into a browser's address bar. A web page may contain text, graphics, and hyperlinks to other web pages and files.

A web page is often used to provide information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers. Multiple web pages make up a website, like our Computer Hope website.

4.3.4BASICS OF PROTOCOLS USED

A web browser lets your computer communicate with web servers around the world and giving you the right informations with just a few clicks away. Different web browsers have different way of retrieving informations, but one thing they have in common is web communication protocols. Web communication protocols are technology used to transfer information across the internet. For example, a web browser uses these protocols to request information from a web server, which is then displayed on the browser screen in the form of

text and images. The degree to which users can interact with that information depends on the protocol.

Defination- "*A protocol is a set of rules that define how two networked computers should talk to each other"*

HTTP

HyperText Transfer Protocol (HTTP) is used by the World Wide Web. HTTP defines how messages are formatted and transmitted and the actions Web servers and browsers should take in response to various commands. For example, when a user enters a URL into a browser and presses Enter, it is HTTP, not the browser, that instructs the ISP's server to fetch and transmit the requested Web page. HTTP works in conjunction with HTML to display WebWeb pages. The Hyper Text Markup Language (HTML) is the protocol that instructs the browser in how aspects of the received Web page are to be displayed. HTTP is called a stateless protocol. Stateless means that each command is run without reference to prior commands. Stateless commands greatly inhibit the ability to add "intellegence" to the language because each command cannot receive or share data with other commands, as occurs in true programming languages. For this reason, many add-in languages have been designed to supplement HTTP to enable interaction with the user: ActiveX, Java, JavaScript, and cookies.

HTTP is a classic "client-server" protocol. Users click a link on their web browser (the client), and the browser sends a request over the internet to a web server that houses the site the user requested. The server sends back the content of the site, such as text and images, which display in users' web browsers. HTTP is an unsecure communications protocol because the data it sends back and forth between a browser and a server is unencrypted and can be intercepted by third parties.

FTP- File Tranafer Protocol

A protocol is a set of rules that networked computers use to talk to one another. And FTP is the language that computers on a TCP/IP network (such as the internet) use to transfer files to and from each other.

Goal of FTP- FTP was created with the overall goal of allowing indirect use of computers on a network, by making it easy for users to move files from one place to another. Like most TCP/IP protocols, it is based on a client/server model, with an FTP client on a user machine

creating a connection to an FTP server to send and retrieve files to and from the server. The main objectives of FTP were to make file transfer simple, and to shield the user from implementation details of how the files are actually moved from one place to another. To this end, FTP is designed to automatically deal with many of the issues that can potentially arise due to format differences in files stored on differing systems.

Overview- After a TCP connection is established, an FTP control connection is created. Internal FTP commands are passed over this logical connection based on formatting rules established by the Telnet protocol. Each command sent by the client receives a reply from the server to indicate whether it succeeded or failed. A data connection is established for each individual data transfer to be performed. FTP supports either normal or passive data connections, allowing either the server or client to initiate the data connection. Multiple data types and file types are supported to allow flexibility for various types of transfers. Figure 2.1 showa the FTP transmission of client-server model.

To ensure that files are sent and received without loss of data that could corrupt them, FTP uses the reliable Transmission Control Protocol (TCP) at the transport layer. An authentication system is used to ensure that only authorized clients are allowed to access a server. At the same time, a feature sometimes called anonymous FTP allows an organization that wishes it to set up a general information server to provide files to anyone who might want to retrieve them.

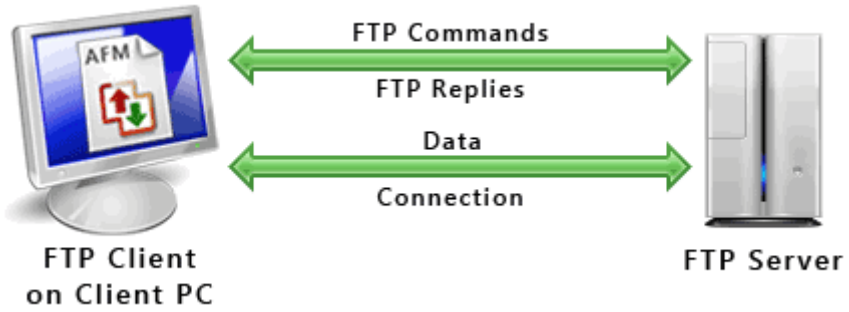

Figure 2.1: FTP Client-Server Model

Main Features of FTP-

- Interactive Access FTP provides an interactive interface to allow humans to interact with remote servers.
- Format Specification FTP allows the client to specify the type and representation of stored data. The user can specify whether a file contains text or binary data.

- Authentication Control FTP requires clients to authorize themselves by sending a login name and password to the server before requesting file transfers.

HTML

HTML stands for Hypertext Markup Language. It allows the user to create and structure sections, paragraphs, headings, links, and blockquotes for web pages and applications.

HTML is not a programming language, meaning it doesn't have the ability to create dynamic functionality. Instead, it makes it possible to organize and format documents, similarly to Microsoft Word.

When working with HTML, we use simple code structures (tags and attributes) to mark up a website page. For example, we can create a paragraph by placing the enclosed text within a starting ** ** and closing ** ** tag.

Below is an example of HTML used to define a basic webpage with a title and a single paragraph of text.

```
<html>
<head>
<title>gjust.org</title>
</head>
<body>
<p>This is an example of a paragraph in HTML.</p>
</body>
</html>
```

HTML5 is the latest version of Hypertext Markup Language, main features of HTML5 include:

- Elimination of outmoded or redundant attributes.
- Offline editing.
- The ability to drag and drop between HTML5 documents.
- Messaging enhancements.
- Detailed parsing
- MIME and protocol handler registration.
- A common standard for storing data in SQL databases (Web SQL).
- Application program interfaces (API) for complex applications.
- Accommodations for mobile device app development.

- Support multimedia embedding

4.3.5 DNS AND JAVA

The domain name system (DNS) connects URLs with their IP address. With DNS, it's possible to type words instead of a string of numbers into a browser, allowing people to search for websites and send emails using familiar names. When you search for a domain name in a browser, it sends a query over the internet to match the domain with its corresponding IP. Once located, it uses the IP to retrieve the website's content. Most impressively, this whole process takes just milliseconds.

- IP addresses help locate a computer on the internet and relay the information (website data, emails etc) traveling between computers. As soon as you type a domain name, for example, gjust.org into your browser, your browser, and computer check if one of them has the domains related IP address in their memory.
- If gjust.org isn't in your computer's local memory (cached memory), it expands the search out to the internet where it queries the DNS to determine if the domain exists in their DNS database. If the first DNS doesn't find it on its server, it sends it to the next server until the right domain name server is found. For example, the URL for gjust.org is associated with servers run by GJU Web Services. The domain name system allows you to reach GJU's servers when you type gjust.org into your web browser.
- Once the DNS server finds the domain name gjust.org, the server returns the domain name, and it's IPS address to the requesting DNS server, along down the line until it arrives back at your computer.
- Once the IP address has reached your computer, your browser finds it on the internet. Next up, it communicate with the domain name hosted to request any associated files. The host server returns the files which display gjust.org in your web browser.

JAVA SCRIPT

JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side script to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities.

CLIENT-SIDE JAVASCRIPT: Client-side JavaScript is the most common form of the language. The script should be included in or referenced by an HTML document for the code to be interpreted by the browser. It means that a web page need not be a static HTML, but can include programs that interact with the user, control the browser, and dynamically create HTML content. The JavaScript client-side mechanism provides many advantages over traditional CGI server-side scripts. For example, you might use JavaScript to check if the user has entered a valid e-mail address in a form field.

The JavaScript code is executed when the user submits the form, and only if all the entries are valid, they would be submitted to the Web Server. JavaScript can be used to trap user-initiated events such as button clicks, link navigation, and other actions that the user initiates explicitly or implicitly.

ADVANTAGES OF JAVASCRIPT

The merits of using JavaScript are –

- Less server interaction − You can validate user input before sending the page off to the server. This saves server traffic, which means less load on your server.
- Immediate feedback to the visitors − They don't have to wait for a page reload to see if they have forgotten to enter something.
- Increased interactivity − You can create interfaces that react when the user hovers over them with a mouse or activates them via the keyboard.
- Richer interfaces − You can use JavaScript to include such items as drag-and-drop components and sliders to give a Rich Interface to your site visitors.

JAVASCRIPT DEVELOPMENT TOOLS

To make our life simpler, various vendors have come up with very nice JavaScript editing tools. Some of them are listed here –

- Microsoft FrontPage − Microsoft has developed a popular HTML editor called FrontPage. FrontPage also provides web developers with a number of JavaScript tools to assist in the creation of interactive websites.
- Macromedia Dreamweaver MX − Macromedia Dreamweaver MX is a very popular HTML and JavaScript editor in the professional web development crowd. It provides several handy prebuilt JavaScript components, integrates well with databases, and conforms to new standards such as XHTML and XML.

- Macromedia HomeSite 5 − HomeSite 5 is a well-liked HTML and JavaScript editor from Macromedia that can be used to manage personal websites effectively.

JAVA

Web Applications are an integral part of any programming language and JAVA is the widely used programming language for developing web applications. The Java technologies used to create web applications are part of the Java EE platform. In order for these technologies to work on a server, the server must have a container, or web server, installed that recognizes and runs the classes you create. A web application often consists of nothing more than one page created with the JavaServer Pages (JSP) technology.

JAVA SERVLET API

The Java Servlet API lets you define HTTP-specific classes. A servlet class extends the capabilities of servers that host applications accessed by way of a request-response programming model. Although servlets can respond to any type of request, the most common use is to extend the applications hosted by web servers.

JAVASERVER PAGES TECHNOLOGY

JavaServer Pages (JSP) technology provides a simplified, fast way to create dynamic web content. JSP technology enables rapid development of web-based applications that are server- and platform-independent. JSP technology lets you add snippets of servlet code directly into a text-based document.

JDBC API

The Java Persistence API is a Java technology standards-based solution for persistence. Persistence uses an object-relational mapping approach to bridge the gap between an object-oriented model and a relational database. Java technology persistence consists of three areas:

- The Java Persistence API
- The query language
- Object-relational mapping metadata

4.4 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

FILL IN THE BLANKS.

1. **……..**is a numerical label assigned to each device connected to a computer network and used for communication.
2. **…….**a set of routines, protocols, and tools for building software applications.
3. Full form of HTML is ……and the latest version of HTML is ……
4. ……..is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet
5. ……..is a internet protocol provided by TCP/IP used for transmitting the files from one host to another.

4.5 SUMMARY

Each form of mass media affected society in important ways. Books allowed people to educate themselves and be more selective about the information to which they were exposed rather than relying solely on teachers or clergy. Newspapers chronicled the daily life of societies and provided a public forum for information sharing and debate. Magazines were the first medium to make major advances in the mass printing of photographs, which brought a more visual medium to their audience before the advent of television. Radio allowed masses of people to experience something at the same time, which helped create a more unified national identity and also brought entertainment and news programs into people's homes. Television copied many of radio's ideas and soon displaced the radio as the centerpiece for entertainment in people's homes. The Internet brought a new decentralized and communal form of media that could not be controlled by any one government or business and allowed for the creation of user-generated content.

Electronic media especially has had to adapt as new forms of media are invented. Radio, for example, lost much of its advertising revenue to television, which led radio to adapt its programming from news and entertainment to broadcasting music. Radio also took advantage of new technologies to become portable and follow people out of their house. Broadcast television had to diversify its program lineup as cable and satellite providers offered many more channels. All these media, even print, had to adapt to the advent of the digital age. Copyright violations—pirating—become a problem when old media content is digitized, which makes it more easily reproducible and sharable.

In earlier days messages were communicated by personal contact, beating of drums and shouting into a megaphone or through traditional media like folk dramas, folk songs, puppetry and even the village Panchayat served as a means of communication. Now with the technological advances newer and faster methods have been innovated. The transmission to remote parts of the country is done through the satellite. This is why national events like the Independence Day and Republic Day celebrations can be viewed all over.

Satellite transmission has symbolized a revolution in communication technology. It has enabled man to conquer distance in that we can make long distance calls to other countries. An other saving factor is time. With the latest telefax system one can telex an entire letter in a short:time to different countries. Web technologies gives us a way to interact with hosted information, like websites. Web technology involves the use of hypertext markup language (HTML), HTTP, DNS, FTP, JAVA.

4.6 KEYWORDS

API: An application program interface (API) is a set of routines, protocols, and tools for building software applications. Basically, an API specifies how software components should interact.

GUI: A GUI (graphical user interface) is a system of interactive visual components for computer software. A GUI displays objects that convey information, and represent actions that can be taken by the user.

Telnet: Telnet is an application protocol used on the Internet or local area network to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection.

IP: An Internet Protocol address (IP address) is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. An IP address serves two main functions: host or network interface identification and location addressing.

4.7 SELF-ASSESSMENT TEST

1. What is a protocol? Why we need protocols?
2. What protocols we use in Web technologies?

3. Write a basic code in HTML lagurage. What is the latest version of HTML?
4. **Write short note on FTP, IP, Internet Service Provider, JSP.**

4.8ANSWERS TO CHECK YOUR POGRESS

1. Interent Protocol
2. API
3. Hyper Text MarkUp Language & HTML 5
4. DNS
5. FTP

4.9 REFERENCE SUGGESTED READINGS

1. https://www.eolss.net/Sample-Chapters/C04/E6-33-03.pdf
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SUBJECT: COMMUNICATION AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. KUSHAM LATA
LESSON NO.: 5	VETTER: PROF. HARISH ARYA
MEDIA TECHNOLOGY:SOCIAL NETWORKING SITES AND WEBPORTAL	

STRUCTURE

5.0 LEARNING OBJECTIVES

After reading this lesson, you must be able to:

- **Learn the basic of social networking sites.**
- **Introduce with the origin and features of social networking site Facebook.**
- **Introduce with the origin and features of Twitter.**
- **Know the origin and features of mobile application WhatsApp.**
- **Understand the technology of web portals.**

5.1INTRODUCTION

Today most of the time we are living in a virtual world.The dependency on technology has been increased in last two decades and the consumption of various media channels too. Websites, Social networking sites and other mobile application taking our most of the time in a day on internet. So, traditional media channels are turned to online media. News, entertainment and sports channels are now turned into mobile application. This paradigm shift in technology make mass behaviour more rigorous.People are using various social networking application to foster the need of information and entertainment. So hereby, it is important to understand about the famous social media sites as a part of online media channels.

After go through this chapter you will learn about the basic technology and the structureof social networking sites - Facebook, Twitter, WhatsApp, Skype and web portals, used as tool of mass communication. You will also learn the basic features provided by these applications to produce and share content online

5.2 INTRODUCTION OF SOCIAL NETWORKING SITES

Social networking operates on many levels, from families up to the level of nations. Play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals. The shape of social networking sites helps to determine a network's usefulness to its individuals.

Social networking sites, a new phenomenon that attracting million of the peoples to adopt the new technology through web 2.0. Social network enables individual to shape his inner tendencies. Connection with a variety of people may help in formation of new characteristic around people's social life. Social networking sites such as Youtube, Facebook, Twitter, Linkedin, Whatsapp, Instagram etc. integrated by people into their daily life. The great strength of social networking are the multiple ways the user has to interact. Social networking provide member with an easy and convenient medium for communicating with family, friends and other.The social networking technology became simple by latest android operating system in smartphones.

5.2.1 FACEBOOK

Facebook is a social networking site, commonly a platform to meet with new people online. Facebook has been widely popular with around one billionactive users in the world. The site has been one of the social media channels to disseminate information, opinions, new ideas and personal thoughts. Every single individual who is associated with internet is also known about this application. It is very easy to connect with Facebook for people with a single e-mail or mobile number. Facebook give platform to millions of the people to meet their family members, friends, peer groups or business organization. Through a profile everyone could connect of the people, also can make advertisement, business, social pages. Facebook secure posts, user information and timeline of the user in data base centre. Three languages are used by Facebook server to encode the data -C ++, PHP (as HHVM) and D language. Different languages work together to compile the data and make it easy to use.

5.2.2ORIGIN OF FACEBOOK

Facebook was invented by an American college student Mark Zukerberg in 2004, just to interact online with his peer group. In a short period of time the site has gained so much popularity. Now, everyone can connect on Facebook through e-mail id or mobile number and interact with anyone around the globe.The site gives variety of features to develop and share the audio-visual content with other users. Facebook changed the online behaviour of the people through social interaction. From its origin this site has become so popular that millions of users mark their presence on the site. According to Statista(2020) report,Facebook has around 347 million active users. Facebook is a social media channel working on website and mobile application.

5.2.3 FEATURES OF FACEBOOK

Facebook is a platform where a profile user may connect online withanother person. The technology enables the users to form content through text, audio and video format in any language. Because of the user-friendlyfeatures, it is very easy to access online profile of other individual or any content related to persons companies. The features of Facebook are very interactiveand give…

1. **Friends-** You simply can add a person to send a friend request to the other profile users. It is very easy process to connect and build online relations. If the other person accepts your request you will be able to see his/her post in our news feed.Facebook

gives you the opportunity to meet with your friends, family members and unknown persons online.

2. **Public-** Facebook has the feature to show your post to anyone you are using the application. It is your choice to whom you want to share the content. Most of the users make their content custom to show only with friends they added to their profile, but if you want wider reach and publicity you can make your content public. This is a best to link with anonymous people online.
3. **Profile-** To connect with people online we have to make a online identity on social media sites. Every social networking site gives users to make their profile by sign in through email or mobile number. This is most fascinating feature of Facebook because it is a self-presentation tool to interact with others. Profile of the user contain profile picture, educational, work and other domestic details of the user. You have to maintain the profile according to your needs on online. For example – if you are using it for personal purpose, you have to keep your information private and if you want to use it for wider prospective you need to open up the basic details.
4. **Timeline-** One of the reasons behind Facebook's popularity is its timeline feature. It is the most attractive feature for the users,itgives you the space to interact with your online friends to showcase yourself. This space has been used to disseminate information, personal content, marketing, advertisingand business purposes. On timeline, we can write content, share other user's content by text, audio or audio - visual format. Other users can also write on your timeline if you allow them.
5. **News feed-** News feed is like a notice board to carry current updates from the people you connected with. News feed on your Facebook profile show what your friends post. It is the place where we get information about what happening around us?. News feed contain individual as well as groups posts, advertisement, and page like suggestions.
6. **Audio & Video sharing-** Facebook is one of the first site enable to post text, audio and video files simultaneously. People shared their emotions, thoughts and information through different format. Specially, video sharing has become a milestone in the history of social networking sites. Short length videos get much popularity through Facebook. A user can easily post HD Video on his profile in MP4 or MOV format.The maximum length is 120 minutes. The maximum file size is 4.0 GB.

7. **Comments & like-** Posts on any social networking site gets popular when users like, comment and share a particular content. If the post liked by many users its become viral content. Some post are highly recommended to users. Comment on a post by other user have different varieties, user give their opinion on post. Nature of comments is very important for any post.
8. **Messenger-**Facebook messenger is a messaging application where Facebook users can connect privately to another user. It is a personal chat room. A user can also make group chat to engage more then one user. Messenger has all the features of content sharing. Video gaming has become very popular through Facebook messenger like – Candy crush etc.
9. **Facebook live-** In recent years, Facebook gained the highest popularity by Facebook live. This feature is very amazing and attractive. People can go live from anywhere just with a good speed of internet. Users apply this feature.

Limitation of character length

Facebook post character limit: 63,206 characters

Facebook username character limit: 50 characters

Facebook Page Description: 155 Characters

Facebook Comments: 8,000 Characters

5.3 TWITTER

Twitter is a microblogging site on which people can post text message and images. This is a platform to share message in few words to understand quickly by the users. Microblogging means 'share short messages with the public having connect list' (Fuchs, 2017). Sharing SMS online to a large number of people.The post on twitter is called 'tweets'.

5.3.1 ORIGIN OF TWITTER

Twitter was launched by Jack Dorsey, Noah Glass, Biz Stone, and Evan Williams in 2006. Tweets were originally restricted to 140 characters, but was doubled to 280 for non-Asian languages in November 2017. Twitter has 13.15 million users in India competing with Facebook and other social networking application (statista,2020). Many of the world

organizations are using twitter profile as their official statements and information. It has also become a source of news for many media channels.

5.3.2 FEATURES OF TWITTER

1. Microblog – Twitter is a micro-blog application where only with few words we connect with the other users. It very easy to use because user post short public messages. It is an instant information sharing website so that user can get it on time. Micro blogs are famous worldwide like -twitter and Weibo.

2. Following- Twitter enable its users to follow person with a username and password. The user can send follow request to other users and if the other user accept, they added in eachother list. A user can fellow any media channel, personalities, business tycoons or any common person who have a twitter account.

3. Retweets-On twitter timeline we tweet our messages by text, images of video files. We can retweet other's post in own timeline. Every tweet has a record of how many times its being retweeted. This a good way to share information to the large audience.

4. Twitter Trends-Most popular term in social media world in present scenario is 'trending'. Twitter has the facility to trend most searched topic at first. Trending topics become popular either through a concerted effort by users or because of an event that prompts people to talk about a specific topic. Every latest information on socio-political topic, news , current event and even big story gets popular by trending on Twitter. Many videos go viral because of the twitter trending search options.

5. Create polls-Another excellent feature of this site is to create polls. A user can ask question to the other users by simply ask a question on twitter. The result of the poll automatically saved by the site. This feature is highly successful in the time of election and something for public opinion on a serious issue.

6. Bookmark- One the best feature of twitter is bookmarking where we can save a post for later view. Bookmark gives us to save the important data so that we can apply it according to our requirement.

7. Hashtag- This feature played a big role in promoting social media campaigns for marketing purposes and for political propaganda. Hashtag is a certain flagging of an event

that created by the user to be in the top on search with their thought or idea. For example- #photography, #birthday, #beautiful etc. are used to be in the search of such kind of words.

5.3.3 WHATSAPP

WhatsApp is a free messaging application available on smartphone having android technology. This application allows users to send text, image, audio and video messages to individual or in group. The nature of this application is basically interactionbetween one to one, but it is also giving the facility to communicate to group at the same time, that's why it is also called social networking application. WhatsApp is launched in 2009 by Brian Acton and Jan Koum, former employees of Yahoo. WhatsApp is accessible from desktop also with smartphone connected to the computer and an internet connection. It allows users to chat with text messages and voice messages,video calling, and pictures, documents, maps, audio and contact number.

5.3.4 FEATURES OF WHATSAPP

1. Text Messages- WhatsApp messenger is a free application where you can send unlimited messages per day. It gave users to chat with your friends, family member via text message. On mobile we used SMS and these SMS's were not fee at all. So because of this application communication through chat became more popular specially in youth. WhatsApp chats are being used for personal and non-personal chats.Maximum limit of WhatsApp message is 65,536 characters

2. Photo and video sharing- Photograph and video can be sent through WhatsApp easily. After the advent of this application photo & video sharing has increased. We can send any JPEG file or MP4 video file to anybody in few seconds it only hindered by your internet connection speed. Image and video sharing of personal moments, talent and arts create a new dimension to Visual communication. We send our personal pictures; we share official documents and news events in short length videos.

3. Group chat- We can make group of the people on WhatsApp for different purposes. WhatsApp Group is a platform where information can be shared with many people at their personal phone number.

Different social, personal and professional groups are there to interact with people. We can make a group with our connects only where admin play the lead role. Text messages, photo and video messages are allowed to share in group. The WhatsApp settings allow a admin to remove or add any member in the group.

4. Voice & video call messages- You can talk to your friends and family for free, even if they're in another country. And with free video calls, you can have face-to-face conversations. WhatsApp voice and video calls use your phone's Internet connection, instead of your cell plan's voice minutes, so you don't have to worry about expensive calling charges.

5. WhatsApp on desktop and Web- WhatsApp on the web and desktop, you can seamlessly sync all of your chats to your computer so that you can chat on whatever device is most convenient for you. You can download separate Application for Windows and iOS, while for WhatsApp web link is provided as "web.WhatsApp.com". User can only access these apps if WhatsApp is installed on validated devices through mobile number activation.

6. Using Google search & translate - Another exciting feature of WhatsApp is the direct googlesearch option and google translate option with keyboard. You can simply translate your text in any language while typing. Google search enable you to find anything with just entering the keywords and share on WhatsApp chat box. Language translation from one language to other is a time saving method for any user who do not know about the other language. For example- if you want to translate from English to Hindi, just type in English in your chat box it automatically converted in Hindi.

7. End to end encryption- Some of your most personal moments are shared on WhatsApp, which is why we built end-to-end encryption into the latest versions of our app. When end-to-end encrypted, your messages and calls are secured so only you and the person you're communicating with can read or listen to them, and nobody in between, not even WhatsApp.

8. User location- This feature attributed to share any location available on google maps. Live location can be sent to other than self with time limits of 15 minutes, 1 hour and 8 hours.

9. Document- You can send PDFs, documents, spreadsheets, slideshows and more, without the hassle of email or file sharing apps. You can send documents up to 100 MB on WhatsApp. These documents can be attached from your phone or computer easily.

5.4 WEB PORTAL

The term "**Internet portal**" or "**Web portal**" began to work in 1990's and used to describe the websites of any organization that included a single access point to surf the web. These web portals were called horizontal portals as there was a limited access to the users. It was not a user-centric, as the content was personalized by the users itself.

The Different type of web portal has been developed after that and used for different context. Initially the 'web portal was used to refer to well-known internet search and navigation sites that provided a starting point for web visitor to explore and access information on world wide web.[4]

Web portals are the gate way of the web- access for the interconnected links on a website. Web is the information delivery system for the internet users that deliver the general information with a URL. Earlier, the web portals were designed in HTML (Hypertextmarkuplanguage).

Iflooking close for an exact definition of the web portals -Howard Strauss explained it firmly by adding that- 'a portal is a user-centric customized, personalized, adaptive desktop (CPAD). The very best enterprise portals will exhibit all CPAD features'.[5]

5.4.1 BROWSING AND SEARCHING ON WEBPORTLS

If you look around, you recognize that so many of people are using internet, searching websites and looking for somewhat different information. This searching is occurring through uncountable number of pages of websites displayed on the Internet. You can view this information with the help of a 'web browser'. it a software application that used to locate web pages or a window that allows you to view online content for example - Internet Explorer, Mozilla Firefox, linx, Safari, Opera and Google Chrome.

One of the popular web browserswe are using today is Google chrome launched in 2008. Google Chrome has dominated the internet browser market for the last decade with a staggering near-60% market share and users stretching into the billions.[7]

To open a web page, one must type the URL(Uniform resource locater) and the URL species the address of web server.

It is an information-sharing tool that is growing at an unbelievable rate .Because there is so much information on the Internet, and so many individual sites and pages, it would be nearly impossible to find what you were looking for by just "browsing" or flipping through sites, not only because of the sheer size of the collection, but also because you wouldn't know what address to go to.

To deal with this, we use a web browser to access a search engine which allows us to search for a particular topic, word, or phrase[8].

SEARCHING WEB

Search engine is required to surf the websites on any browser. A search engine enables individual to discover specific information within the huge world of data that's stored on the internet. It's usually a dedicated website, but it also may take the form of an application on a hand-held device or simply be a 'search window' on a website that can be about almost anything.

Searching starts with typing words into the searching box on the home page of any search engine such as Google , Yahoo, Bing etc. By clicking on Search button, a page will appear containing results of the keywords that contains links to various web pages. All these web pages will be related with the key word we type on the box. These results, commonly known as 'hits', will usually be listed in order of relevance to the exact terms entered. Some search engines even display results that are tailored to your previous search activity.

Difference between Browsing and Searching

Browsing	Searching
Browsing is done using web browser.	Searching is done using a search engine.

Browsing is targeted on particular websites, as user knows where to look what is required.	Searching is random and most popular/relevant searches shows the user the website he/she need to visit.
Browsing is faster and easy.	Searching is slow and tough process.
Using browsing, information is cantered towards one topic.	In Searching, results are cantered towards multiple topics
Browsing is process of reading with target.	A Searching is process of studying without explicit target.
A browsing is less satisfactory than surfing as surfing need lots of information sources to be visited.	A Searching is more satisfactory

5.5 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

CHOOSE THE RIGHT OPTION.

1. Today the most popular social networking site is?
   a) Twitter
   b) Facebook
   c) Linkidin
2. Which one is the most famous mobile messaging application?
   a) Telegram
   b) Facebook Messenger
   c) WhatsApp
3. Which one of the following is a Microblogging site?
   a) Blogger
   b) Twitter
   c) Wordpress
4. Which is the primary language for Web portals?
   a) XXLM
   b) HTML
   c) JAVA
5. Identify the name of search engine from the following
   a) Internet explorer

b) Google chrome
c) Bing
d) Mozilla

5.6 SUMMURY

This chapter concluded the basic of new media technology that are used in new communication system. These technologies are easy to use and affect most of the people behaviour. Facebook is attracting most the users for all personal and professional relations. Twitter has been using for the purpose of official statements and WhatsAppgets popularity by personal chatting and group activity online. All these new technologies has various different features to use properly. You also learned about the webportals and their working. Basic understanding is important to understand the concept thoroughly. This chapter gives insights to the media technology.

5.7 KEYWORDS

Micro-blog- Microblog means 'share short messages with the public having connect list'.

Hashtag- a word or phrase in type of metadata tag share with '#' sign on social networking sits is called hashtag. Hashtag is used for different social media campaign.

Tweets-means chirp of a small bird, but for 'tweet' now is used for twitter posts because these posts has few words limit.

Encryption- When your messages and calls are secured so only you and the person you're communicating with can read or listen to them, and nobody in between, not even WhatsApp.

5.8 SELF-ASSESMENT TEST

1. What is the role of Facebook to connect people?
2. Describe the features of Twitter?
3. What is the most fasinating feature of WhatsApp?
4. What is the difference between web portal and wesites?
5. Give name of five famous browsers?
6. Give name of five famous search engines?

5.9 ANSWERS TO CHECK YOUR PROGRESS

1. Facebook
2. WhatsApp
3. Twitter

4. HTML
5. Bing

5.10 REFERENCES/SUGGESTED READINGS

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SUBJECT: COMMUNICATION AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. KUSHAM LATA
LESSON NO.: 6	VETTER: PROF HARISH ARYA
E-COMMERCE: BUYING, SELLING & ADVERTISEMENT	

STRUCTURE

6.0 LEARNING OBJECTIVES

After go through this lesson you will be able to:

- **Understand the concept of E-commerce.**
- **Know about main element of 5'C model of E commerce.**
- **Learn the nature of selling using your own website.**
- **Learn the nature of buying using your own website.**
- **Understand e-banking concept and E- advertisement's process.**

6.1 INTRODUCTION

E- Commerce is developed in online environment with retailing of various product & services. Advertisers have found various ways to promote their products and services through online advertising since the rise of the Internet. Social networking sites has been helping for the growth of online sites, and attracts large number of visitors.

Advance digital marketing offers new opportunities to target consumers in increasingly personalized ways. Branding and direct sales are the main reasons for the companies to stay online. Branding of a product can increase the value of product. Direct selling tries to persuade the consumer for an immediate action, by clicking the advertisement.

Online companies gaining high ad revenues by their services and people are using the online services for their day to day needs. The popularity of online companies can be measured by their revenues per year.

Social networking provides unique opportunities where brand can target their audience and interact with user with a powerful impression. On Facebook, people express their unique identities and have a chance for the advertiser to collect the details of potential consumer. That will increase the interaction between the two and more targeted way to connect for the better responses.

E-commerce is an effective marketing platform because networking and communication are already taking place. This allows companies to be directly woven into conversations simply by appearing on the website.

6.2 COMMUNICATION TECHNOLOGY AND E-COMMERCE

Modern communication and information technologies can enable changes in organization structures and business processes, and they affect the competitive advantage of firms. Under their influence, markets gain increasing importance as a coordinating form. But due to the increasing use of modern telecommunications media, the market and events within market structures are also changing. The drivers, nature and magnitude of these changes are focal points and promoters of electronic commerce and are addressed in this contribution.

For example, electronic data interchange (EDI) and electronic mail are the underlying commercial tools of the operation of electronic commerce. Nevertheless, it is impossible to trade on EDI without contractual agreement. Both EDI and electronic mail can today be

viewed as value-added network services, and they allow the user to substitute electronic forms for their paper-based counterparts.

The emerging strong interest in the Internet and mobile technology, as well as the frenzied trend, has led the attention of businesses around the world at key industry conferences such as relevant business literature, activity on the Internet and annual industry conferences to find a role, presence or niche marketing idea.

With the advent of the Internet and smartphone industry a new medium has emerged whose potential is more dynamic than traditional colour printing, radio, or television. The appeal of such universal connectivity and access is driving firms to the mobile applications. It appears that all this focused interest, current developments, and apparent perceived importance by the business world.

6.2.1 DEFINITION OF E- COMMERCE

E-commerce refers to activity of buying and selling of products, goods or services over electronic systems such as the internet and other computer networks. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, Electronic Data Interchange (EDI), inventory management systems, and automated data collection systems. E-commerce businesses

Online shopping web sites for retail sales direct to consumers

- Providing or participating in online marketplaces, which process third-party business-to-consumer or consumer-to-consumer sales
- Business-to-business buying and selling
- Gathering and using demographic data through web contacts and social media
- Business-to-Business (B2B) electronic data interchange
- Marketing to prospective and established customers by e-mail or fax (for example, with newsletters)
- Online financial exchanges for currency exchanges or trading purposes

To come to the conceptualize the term 'E-Commerce' let us discuss about some attributesof E-Commerce. Digitalization of business is important to stay in the field. This means a comprehensive usage of Information & CommunicationTechnology (ICT) required within a business organization.Usage of a global network like Internet plays a dominant role and has become a universal technical infrastructure to build e-commerce virtual space where every organization and person beinginterested in making business and come together without geographical restrictions.

6.2.2E-COMMERCE WITH THE "5-C-MODEL"

One of the significant approaches to define and explain the E-Commerce iscomes from the so-called5-C-model (Zwass 2014). It defines E-Commerce by five activity domains whose denominationsstart with the letter "C". This 'C' is related with commerce, collaboration, communication,connectionandcomputation.

1. Commerce: The electronic marketplace combines customers and suppliers, a establish transaction conditions, and facilitate exchange transactions. Comprehensive move to web-enabled enterprise systems with relatively uniform Capacities, compared to legacy systems, are a universal supply-chain linkage has been made.

2. Collaboration: The Web is a vast nexus, or network, of relationships among firms and individuals.More or less formal collaborations are created or emerge on the Web to bring togetherindividuals engaged in knowledge work in a manner that limits the constraints of space, time, national boundaries, and organizational affiliation.

3. Communication: As an interactive medium, the Web has given rise to a multiplicity of media products.This universal medium has become a forum for self-expression andself-presentation through social media.The rapidly growing M-Commerceenables connectivity with consumers via targeting through different social networking sites, locations and many other sensitive login details for advertising.In the communications domain, the Web also servesas a distribution channel fordigital-products.

4.Connection: Common software development platforms, many of them in the open-source domain,enable a wide spectrum of firms to avail themselves of the benefits of the already developed software, which is, moreover, compatible with that of their trading and collaboratingpartners.The Internet, as a network of networks thatis easy to joinand out of which it isrelatively easy to carve out virtual privatenetworks, is the universal telecommunicationsnetwork, now widely expanding in the mobile domain.

5. Computation: Internet infrastructure enables large-scale sharing of computational and storage resources, thus leading to the implementation of the decades-old idea of utility computing. An additional term is also there called M-commerce commonly understood as the usage of mobile applications for buying and selling of products online.

- Main features of M-Commerce are:

  Location independence of (mobile) customers,

  High availability of services through well-established mobile phone networks,

  Increasing computing power of mobile devices,

  Interactivity of mobile devices (voice and data transfer),

  Security (when using mobile phone networks),

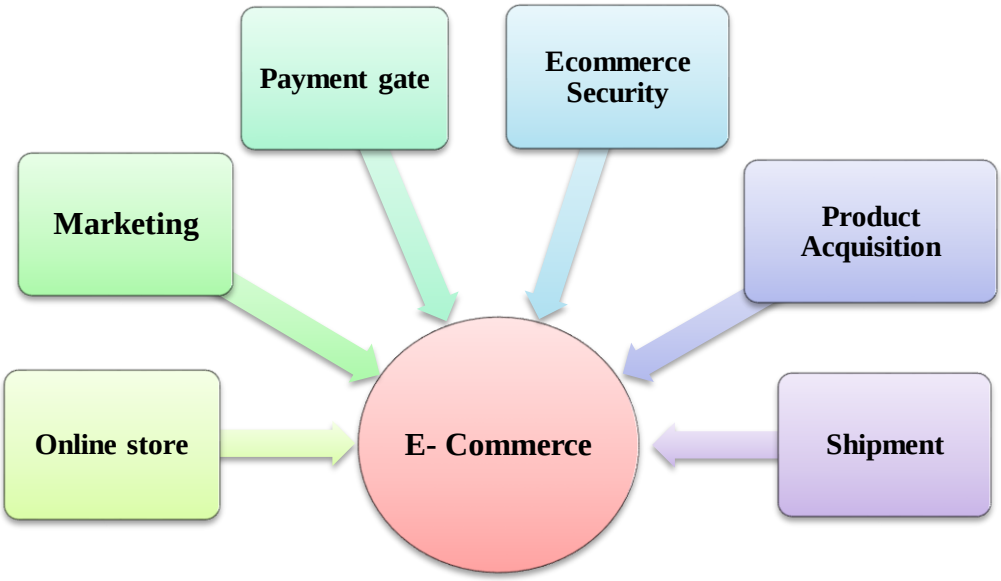
  Localization of customers through cell structure,

  Accessibility of customers,

  Potential of personalized services/offers.

6.2.3 BASIC ELEMENTS OF E-COMMERCE

E-commerce is associated with so many sub-sections of offline business. There are various tools to upgrade the business into new technology. To start anonline business needs all the legal and administration formalities as well as the main tools internet related with customer buyer relations. The basic element to plan a new start up online needs some understanding of the following measures:



1. **Online Store:** E-commerce website is the most important aspect of any company who wish to deal with customer online. Similarly, well organized and standard ecommerce website could transform visitor into buyer. Obviously, website is the core for an online business, as it the main platform of connection between buyer and supplier. They can exchange their interest with each other on the site. Supplier of website target their customers by their choice of interest using their search history. A well portrayed and impressive website with images and detailed specification can help the potential customer to take decision whether to buy the product from that site or not.
2. **Online and Offline Marketing:** Marketing and advertising tools can be used carefully to grab the attention of potential buyers in online stores and help them convert into buyers. Currently, Search Engine Optimization (SEO)and Pay Per Click (PPC), Social platforms such as Facebook, Twitter, LinkedIn and YouTube are used as tools of online advertising and these media played a significant role in customer retention and acquisition. Traditional advertising tools such as brochures, hoardings, pamphlets can also help to persuade customers' mind to take a positive decision regarding online buying.
3. **Payment Gateway (Online Transaction):** A payment gateway is a method of transacting money online when purchasing any product or services on the Internet. Initially credit card was the most accepted method of online payment.

But later, other means of payment such as PayPal, Payumoney, razorpay, billdesk, cavenues and citrus have been integrated in virtually all e-websites. Now, Cash on Delivery has gained immense popularity among online buyers. Other offline modes such as bank transferi.e RTGS, IMPS, demand draft and cheques, etc are also accepted for making payment in ecommerce website.

4. **Ecommerce Security:** The importance of online security system in the website is as important as having a security guard in front of a showroom or ATM. If your website gathers personal information from your customersonline account, it is mandatory to use security systems like SSL (Secure Socket Layer). This secure server software encrypts all sensitive information and protects the data against unauthorized access and disclosure. After installing of a security system, a company can ensure your customers about the security of personal data.
5. **Product Acquisition:** Product acquisition is the core segment of an e-commerce organization. This is the basic requirement to develop an e-business organization or any other traditional organization. Initially, you need to get products for your business then you can plan for optimal growth and development of the organization.
6. **Shipment:** The time has come to process your online order and you will have to deliver it to the end users. At that time, you need a reliable and professional shipment or logistic service provider who can safely deliver the product on time to the customer.

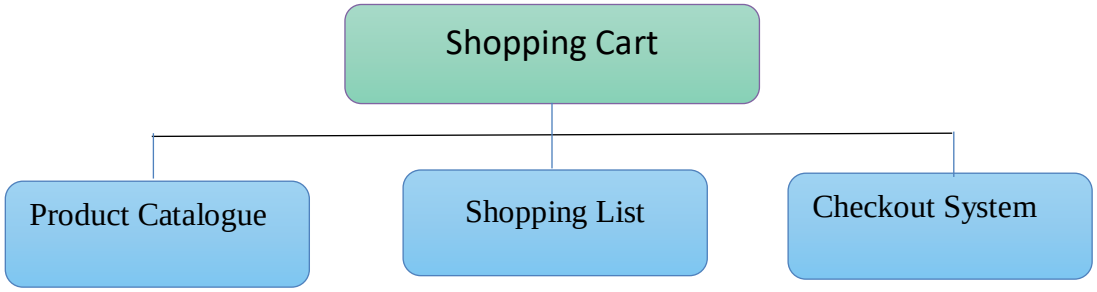
   Failing to meet or deliver the expectation at the stipulated time can result in loss or damage to the business or reputation of an ecommerce enterprise. Thus, the shipment method requires great discipline and automation to maintain high volumes of orders and trust for its customers.
7. **Customer Care Assistance:** Customer support is an important aspect of online business as it can win or ruin the trust of buyers. The seller-buyer relationship in online business incredibly depends on customer support services. High-quality customer care services can motivate, motivate and influence a customer or customer with their prompt and class support while poor customer support can prevent e-commerce sales.

6.3 ONLINE SELLING USING YOUR OWN WEBSITE

Setting Up an Online Store

For an online store all you need is a computer and a website page to connect the buyers. Online selling is emerged with the collaboration of the different market segment. Online store keeps these channels under one roof. In order to process an online sales transaction three things are needed.

1. **Shopping Carts**software keeps track of what the user selects to buy from the website before proceeding to the "checkout". An online shopping cart consists of three parts:



   a. **The product catalogue** is made up of all the information needed to present any product to the customer and to complete a sales transaction online. Information to be included in the product database generally includes the price, identification number (SKU), image or other multimedia information, product options or choices.

   A shopping list allows users to track the items they want to purchase. A shopping cart image is generally used to show what items the shopper has selected for purchase. In order for the shopping cart to function properly the user's computer must be set to allow "cookies". The checkout system allows customers to select products by clicking an "add items to cart" button and then enables them to pay for these products.

   b. **A shopping list** (i.e. list of selected products) allows users to track the items they want to purchase. A shopping cart image is generally used to show what items the shopper has selected for purchase. In order for the shopping cart to function properly the user's computer must be set to allow "cookies".

   C. **The checkout system** allows customers to select products by clicking an "add items to cart" button and then enables them to pay for these products.

2. **Secure Server** The secure server helps provide protection against the loss or modification of personal information. Secure Socket Layer (SSL) is the most commonly used technology for secure online transactions. SSL encrypts (or codes) all data between the shop's server and the customer's computer. This makes it very difficult for third parties to decode any information exchanged such as credit card numbers. The following diagram

shows how a secure server can protect information passed between the consumer and the merchant

3. **Payment Processing Options**There are three payment processing options:

A. Third Party Payment Processing Software.

B. Internet Merchant Account.

C. Manual (Offline) Payment Processing.

Some tips for Attracting and Keeping Online Customers

Effective marketing techniques and good customer service required you to attract and retain online customers. Some more tips for Attracting and Keeping Online Customers

- Offer returns policy in store.
- Time to time offer incentives and special discounts tocustomers.
- Prepare both on and offline marketing strategies to boost your online sales.
- Ensure timely shipping of products.
- Respond to customer queries & feedback timely.
- Make purchasing as easy and stress-free as possible for the customer.
- Clearly mention product details, so that buyer don't get confused.
- Provide online receipts for all transactions.
- Show stock availability and estimated delivery times.

6.3.1 ONLINE BUYING FOR YOUR OWN WEBSITE

An e-commerce website which sales services or goods has options to manufacture, stock or provide a product.

- A simple ecommerce website, often use a warehouse for themselves to store products. They buy product from distributors and wholesalers to get good rates. Then they put up those products on their website and do a stock update as and when sales occur. This practice is similar to a traditional offline business, only that they are selling over the Internet instead of having a physical retail shop. Also, there is additional burden of shipping of sold product.
- Moreover, there are ecommerce sites which adopt the "marketplace" model. They set up an e-commerce platform and allow other vendors to sell their products through the platform. These ventures would often provide for warehouses as well where the

vendors can store their product. Other facilities like shipping may be handled on behalf of the vendors as well.

- Third type of ecommerce website are those manufacture their product and sell them on their own website.
- Bigger e-commerce websites like Amazon &Flipkart uses a hybrid of the above models.

6.4 Banking and Advertisement: An overview

Banking is much needed part of ecommerce website because it is the only possible fastest way to get transaction done between two businesses and customers. While advertising is required to reach huge number of potential customers. Electronic banking laid the groundwork for speed and convenience in individual and commercial (business) banking.

The spread of personal computer use has added another layer of convenience and speed to the process. Electronic banking allows customers of most banks to do their banking at any hour of the day, regardless of the bank's operating hours. If customers choose to do such things as transfer funds or pay bills, they can usually do so from anywhere Internet access is available.

6.4.1 E- Banking

Electronic banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents. Transfers of funds occur between financial institutions such as banks and credit unions. They also occur between financial institutions and commercial institutions such as stores. Whenever someone withdraws cash from an automated teller machine (ATM) or pays for groceries using a debit card (which draws the amount owed to the store from a savings or checking account), the funds are transferred via electronic banking.

Electronic banking relies on intricate computer systems that communicate using telephone lines. These computer systems record transfers and ownership of funds, and they control the methods customers and commercial institutions use to access funds. A common method of access (or identification) is by access code, such as a personal identification number (PIN) that one might use to withdraw cash from an ATM machine.

As online banking has become more sophisticated, banks have been formed that operate exclusively as electronic banks and have no physical storefront for customers to use. Without the costs of purchasing and maintaining physical "bricks-and-mortar" structures like

traditional banks do, online banks are able to offer higher interest rates on savings accounts (interest payments are fees that customers collect for keeping their money in the bank). Customers at online banks can use the Internet to conduct all the standard banking transactions.

6.4.2 Online advertisements by E-commerce

It is a form of marketing and advertising which uses the internet to deliver promotional marketing messages to consumers.

Online advertising is also known by several other names:

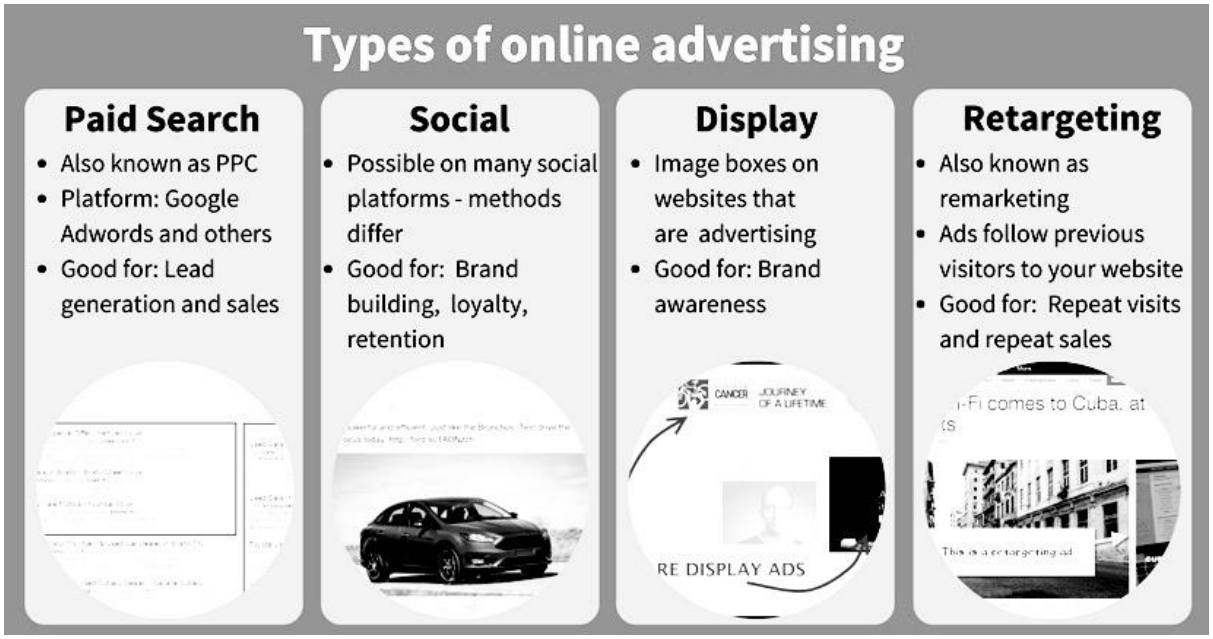
- Paid advertising
- Online marketing
- Pay-per-click (PPC)
- Paid channel marketing
- Internet advertising
- Web advertising

Whatever term you choose to use, online advertising is one of the most effective ways for businesses to expand their reach and find new customers.

THE MAIN TYPES OF ONLINE ADVERTISING

There are essentially two ways to attract visitors to your site: organic (or "free") traffic and paid for traffic, of which a large part is online advertising.

Within online advertising there are several options available, each of which is used in different circumstances, and across different platforms, to drive traffic to your e-commerce site. Although there are others, this high-level overview shows the main types of online advertising:

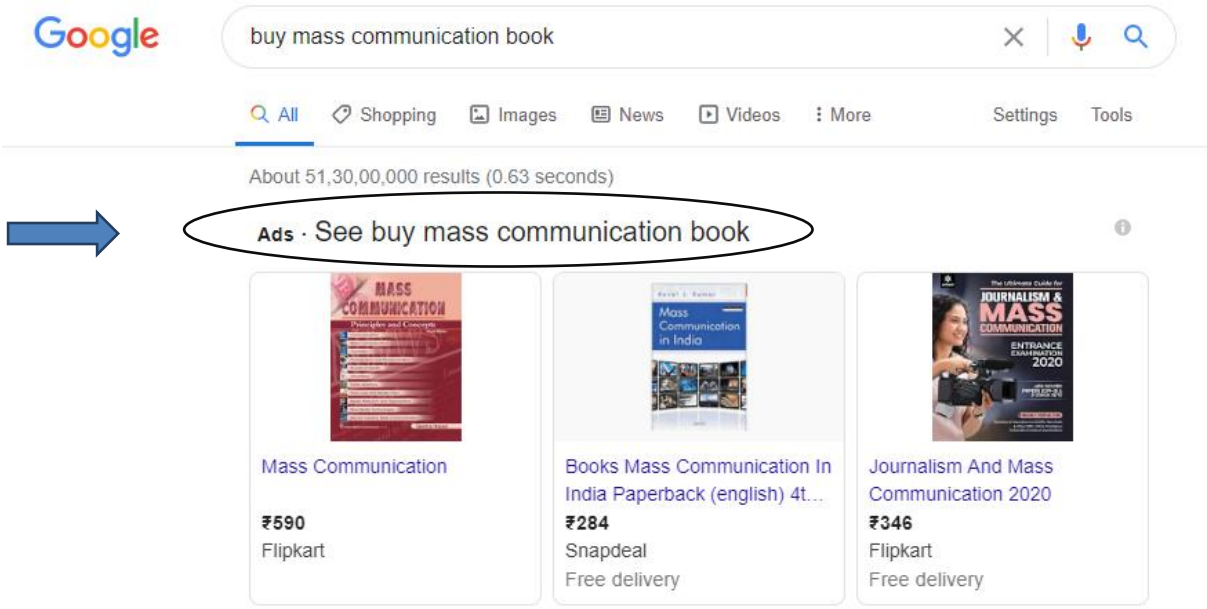


Pay-per-Click (PPC) advertising: Sometimes the industry refers to PPC as a type of ad, but rather it is a method of payment (you are charged when a visitor clicks on your ad). This option is available on many platforms, like Google Adwords, Facebook, Twitter, LinkedIn, YouTube and Instagram.

Paid options to drive traffic to your store

Online advertising collectively describes the channels or methods you can pay for to attract traffic to your site. Below we highlight 5 areas or 'channels' where you can make use of online ads to attract visitors.

1. Search engine marketing (SEM): Search engine marketing is the practice of raising awareness of a business using paid advertisements that appear on search engine results pages. You pay a provider like Google Adwords (which dominates this channel) to show your ad. Then when a user types their query into a search engine, relevant paid ads appear next to the normal organic search results. These organic results are generated by SEO (search engine optimisation), which works in a similar query-based way, but is not paid for. The main types of SEM are text ads, as shown in the picture below, product listing ads and shopping ads.



2. Social media channels: Social media advertising comprises the ads served to users on social media platforms. Because social networks have access to user information, they display highly relevant advertisements (i.e. based on specific interests, behavioural interactions and other custom targeting). You can advertise on:

- Social networks like Facebook, LinkedIn and Google+,
- Photo-sharing websites like Instagram, Snapchat or Pinterest
- Video-sharing websites like Youtube, Facebook live, Periscope or Vimeo
- Microblogging sites like Twitter or Tumblr

3. Price comparison websites: On Price Comparison websites, you have the option to (a) list your products, in which case you pay a fee when someone clicks on any of them, or (b) pay upfront to place an ad on the site.

4. Affiliate marketing: Affiliates are other individuals or businesses who recommend your products, and usually receive a commission for doing so.

5. Mobile marketing: The mobile market is on a huge upward trend and it offers several different types of paid advertising, from bulk SMSes or MMSes, to mobile search and proximity marketing.

6.5 CHECK YOUR PROGRESS

Note: 1) Use the space below to write your answers.

2) Compare your answers with those given at the end of this lesson.

1. Define E-Commerce with suitable example?

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……

……..

2. What is online and offline marketing?

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3. What is Product Catalogue?

……

……

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4. Discuss about E-banking?

……

……

……

6.6 SUMMARY

- To come to a conceptualize the term 'E-Commerce' let us discuss about some attributesof E-Commerce. Digitalization of business is important to stay in the field. This means a comprehensive usage of Information & CommunicationTechnology (ICT) required within a business organization.
- E-commerce website is the most important aspect of any company who wish to deal with customer online. Similarly, well organized and standard ecommerce website could transform visitor into buyer. Obviously, website is the core for an online business, as it the main platform of connection between buyer and supplier.
- A simple ecommerce website, often use a warehouse for themselves to store products. They buy product from distributors and wholesalers to get good rates. Then they put up those products on their website and do a stock update as and when sales occur.
- As online banking has become more sophisticated, banks have been formed that operate exclusively as electronic banks and have no physical storefront for customers to use. Without the costs of purchasing and maintaining physical "bricks-and-mortar" structures like traditional banks do, online banks are able to offer higher interest rates on savings accounts.

6.7 KEYWORDS

PPC- Pay Per Click

SEO - Search Engine optimisation

EDI- Electronic Data Interchange

6.8 SELF-ASSESSMENT TEST

1. Discuss in detail about e-commerce in India?
2. What is the basic element of E-commerce?
3. What do you understand about online selling?
4. Define the type E-advertisements?
5. Describe the process of online transactions?

6.9 ANSWERS TO CHECK YOUR PROGRESS

1. E-commerce refers to activity of buying and selling of products, goods or services over electronic systems such as the internet and other computer networks. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, and online transaction processing. The example of e-commerce sites are Amazon, flipkart, Snapdeal etc.
2. Marketing and advertising tools can be used carefully to grab the attention of potential buyers in online stores and help them convert into buyers. Currently, Search Engine Optimization (SEO) and Pay Per Click (PPC), Social platforms such as Facebook, Twitter, LinkedIn and YouTube are used as tools of online advertising and these media played a significant role in customer retention and acquisition. Traditional advertising tools such as brochures, hoardings, pamphlets can also help to persuade customers' mind to take a positive decision regarding online buying.
3. The product catalogue is made up of all the information needed to present any product to the customer and to complete a sales transaction online. Information to be included in the product database generally includes the price, identification number (SKU), image or other multimedia information, product options or choices.
4. Electronic banking is a form of banking in which funds are transferred through an exchange of electronic signals rather than through an exchange of cash, checks, or other types of paper documents. Transfers of funds occur between financial

institutions such as banks and credit unions. They also occur between financial institutions and commercial institutions such as stores.

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SUBJECT: COMMUNICATION AND INFORMATION TECHNOLOGY	
COURSE CODE: MSM-502	AUTHOR: DR. KUSHAM LATA
LESSON NO.: 7	VETTER: PROF. HARISH ARYA
WEB PAGE DEVELOPMENT	

STRUCTURE

7.0 LEARNING OBJECTIVES

After go throw this lesson you will be able to:

- **Learn the technology of web page designing.**
- **Understand the difference between web page and website.**
- **Introduce the main component of web page designing.**
- **Know the basic of overall web page development.**

7.1 INTRODUCTION

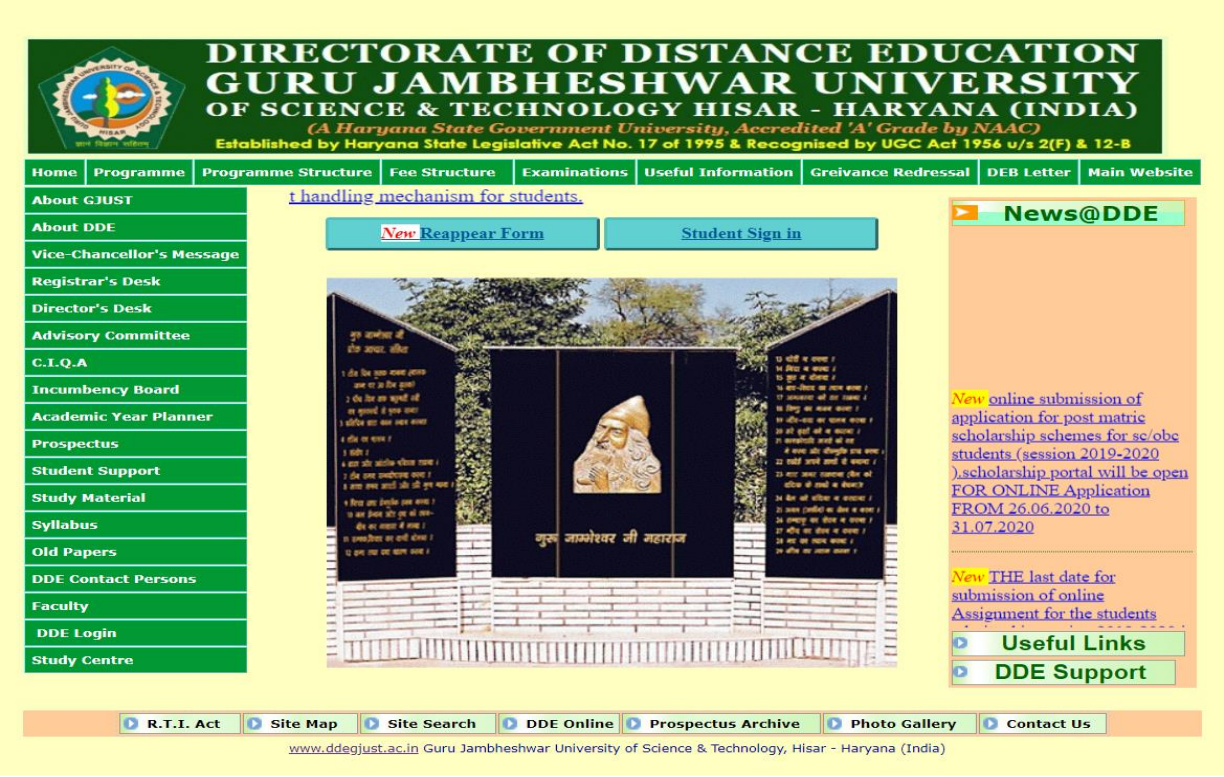
This lessonis to introduce the learner about the web page development. After the advent of the internet websites became the main source of information for all the internet users. In today's world the place where most people in most markets go is to the ‘internet’. We all know that websites are very important these days in capturing new customers.Web design is important because it impacts how your audience perceives your product, brand or service. The impression you make on them can either get them to remain on your page and learn about your business or leave your page and turn to a competitor. A good web design helps

you keep your leads on your page.Many web page design elements and practices influence how you share content on yoursite, which in turn affects how search engine index your website. Website is the representative of your company or business so it important to design it better to welcome on your page. So, let us first understand about the webpage formation.

7.2 INTRODUCTION OF WEB PAGE

A 'webpage' or 'Web Page' is a document, commonly written in HTML that is viewed in an Internet browser. A web page can be accessed by entering a URL address into a browser's address bar. A web page may contain text, graphics, and hyperlinks to other web pages and files.

A web page is often used to provide information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers. Multiple web pages make up a website, like our University's Website.



Should I use "Web Page" or "webpage" when writing?

Both versions are technically correct. However, most style guides suggest Web Page (two words) instead of Webpage in all forms of writing.

How to open a web page

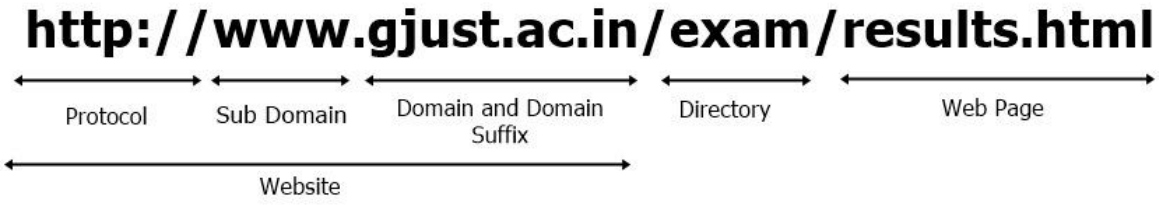
Viewing a web page requires a browser, like Internet Explorer, Edge, Safari, Firefox, or Chrome, Dolphin. Once you are into a browser, you can open a web page by entering the URL in the address bar. For example, typing "*http://www.gjust.ac.in/exam/results.html*" (or copying and pasting) opens the *Guru Jambheshwar University*'s result page. If you don't know the URL of the site you'd like to visit, you can use a search engine to find it.

When was the first web page created?

The first web page was created at CERN by Tim Berners-Lee on August 6, 1991. You can visit and browse the first website and the first web page at the "http://info.cern.ch" address.

7.3 DIFFERENCE BETWEEN A WEBSITE AND WEB PAGE

A website refers to a central location that contains more than one web page. For example,www.gjust.ac.in is considered a website, which includes thousands of different web pages of Guru Jambheshwar University.



In the example URL above, the web page is "results.html" and is always the last part of the URL. For URLs not having an ending of .htm, .html, .php, .cgi, .pl, or another file extension, the server loads the default index.htm web page in that directory.

Examples of a web page

The URL we used as example, of differentiating between website and Web Page, is an example of a web page. It comprises several web technologies, including HTML, CSS, and JavaScript.

Although the web page body is created using HTML, that HTML code can be created using an HTML editor and written by a human or generated using server-side scripts or other scripts. A web page created by a human often ends with a .htm or .html file extension and known as a static web page. For example, this page uses "result.html" as its file name.

Dynamic web pages generated by a script can end in .cgi, .php, .pl, and other extensions depending on the language generating the page.

What can you do on a web page?

On most websites, you feed or read the information contained on the page, and if there are any interesting hyperlinks, you follow those links to find more information or perform a task. You can also listen to music, watch videos, shop, communicate, and much more on many websites.

7.4 BASIC COMPONENTS OF A WEBPAGE

The basic components of designing of a web page are used in form of images, text, audio, video, graphics, animations and other multimedia content interacting with Internet users. These components are used to draw the content on webpage. But there are some more following components that used to structure a webpage:

List of homepage component:

1. Header.
2. Navigation.
3. Logo.
4. Menu items.
5. Hero image /slider.
6. Text matter.
7. Service offer.
8. Service list
9. Showcase of portfolio items.
10. Footer.
11. Contact details in footer.

List of components of about page:

1. Header.
2. Navigation.
3. Menu item.
4. Author image.
5. Author information / skill set.

6. Author portfolio showcase.
7. Author Achievement.
8. Author credibility and Authority (Important).
9. Footer same as home page.

List of components of contact page.

1. Header / Navigation / logo / menu item and footer same as home page.
2. Contact address.
3. Contact Number.
4. Contact Form.
5. Location in Map.

Privacy Policy and Term and Condition page.

1. Header / Navigation / logo / menu item and footer same as home page.
2. List of privacy policy and term and condition.

List of some Design guide / style HTML Element for all html pages.

1. Typography (Paragraph, heading tags and all form of text on pages).
2. Optimize Images (Make sure you have high image quality and same color scheme in all images).
3. Form Elements.
4. Colour scheme for website.
5. Proximity (White space between element - Important).

Example ofcomponents of a web page?

Every web page is different. However, most pages contain some or all of the components contained on following web page. Below is an overview of the major components of a web page.

1. The website, blog name, logo, or company name is often in the top-left corner or top-middle of each web page. The logo may also include a slogan or brief statement about the site to give visitors an instant understanding of the site. Also, this section of the web page is usually a link that may link back to the homepage.
2. Social share links allow visitors to share your site with other co-workers, friends, and family on social networking sites.
3. Additional information and tools such as a language change button, print the page can also be helpful for users on most web pages.
4. The navigation bar, or menu for a web page, is often found on the top or left side of each web page. It should include links to each of the major sections of the website. It is also often including CSS (Cascading Style Sheets) and JavaScript. This document usually can be accessed by entering its URL address into a browser.
5. Webpages and websites with announcement provide this area. Where announcements and notifications flashes for latest updates. These areas works as beacon and broadcast news.

6. The Copyright and any legal or privacy notice should also be on all web pages. Not only can this link to relevant legal information it is an indication for most visitors that they have reached the end of the web page.
7. An information providing webpage have hyperlinks and quick links. So that a user didn't have to go through cascade menu and can directly go to desired webpage. Not every single user knows the categories of cascade menu. Quick links help them to reach a webpage. Contact us, Feedback forms, support, help desk links can be found under them sometimes or at the end of page.
8. Most of academic, business, shopping, webpages show their working, achievements, Infrastructure, Products, latest events or whatever they want to show on there page as Images or video formats. These photos/video gallery makes a webpage lucrative and elaborate.
9. Search bar: The search allows a visitor to search a website for related information and should be available on every page.
10. Advertisement: Advertisement banners can be shown in different places on a web page and help pay for the expenses of running a website and company. Ad banners are

often found at the top, left, right, or bottom of a page and may also be included in the content.

11. Feedback: Having a method of allowing a visitor to provide feedback is also a requirement for most web pages. Giving the visitor links or buttons to click for feedback is a good step to let you know if a web page is helpful or not.
12. Back to top: Finally, a "back to the top" button or link at the bottom of the page helps the visitor return to the menu links or other tools.

7.5 DEVELOPMENT OF WEB PAGE

Development of a web page is generally referred as web development in a broad scenario.Web development refers to building, creating, and maintaining websites. It includes aspects such as web design, web publishing, web programming, and database management.

While the terms "web developer" and "web designer" are often used synonymously, they do not mean the same thing. Technically, a web designer only designs website interfaces using HTML and CSS. A web developer may be involved in designing a website, but may also write web scripts in languages such as PHP and ASP. Additionally, a web developer may help maintain and update a database used by a dynamic website.

Web development includes many types of web content creation. Some examples include hand coding web pages in a text editor, building a website in a program like Dreamweaver, and updating a blog via a blogging website. In recent years, content management systems like WordPress, Drupal, and Joomla have also become popular means of web development. These tools make it easy for anyone to create and edit their own website using a web-based interface.

While there are several methods of creating web pages, there is often a trade-off between simplicity and customization. Therefore, most large businesses do not use content management systems, but instead have a dedicated Web development team that designs and maintains the company's website(s). Small organizations and individuals are more likely to choose a solution like WordPress that provides a basic website template and simplified editing tools.

What are the essential things to develop a webpage and tools used by professionals?

An idea is the most essential thing to develop a web page. If you are going to do something then you must have an idea of what are you going to do. That's the most primary thing you do to develop web page. Get an idea, draw a plot, format your layout and move to next part of development.

A computer is the second essential thing. Some of you might find this funny but time has it, almost everything is being done on smart phones. You are reading it on book or a mobile device then it's the pretty obvious to get a computer for web development.For serious web development, it's betterto invest in a desktop or laptop computer running Windows, macOS or Linux.

HTML (Hypertext Mark-up Language) is the primary building block ofcreating a website.HTML is a very basic mark-up language and requiresmemorization of a few dozen HTML commands that structure the lookand layout of a web page. Before writing any HTMLcode or designingyour first web page, you must decide on an HTML editor or text editor,such as Notepad or WordPad.After installing an HTML editor and are ready to begin setting up your website,think about how you want the site to look and be set up. Consider even drawingout your ideas, to help visualize the site and pages on the site. Below are some considerations to think about when designing yourweb page.

1. How are you going to store all the files? Are all the files going to be in the same folder or directory? If you plan on having lots of different pictures and files, its recommended you store the pages, files, and pictures in separate directories.

2. Are the HTML files going to be stored as .HTM or .HTML files? There is no advantage or disadvantage of going with .htmor .html. However, it is a good idea to stick with the same extension.

3. Do you plan on having a template for the pages? Are all the pages going to have the same overall look and feel?

4. How is the navigation going to be handled? Do you feel its better for the navigation menu to be on the left, bottom, or top ofeach page?

A text editor, to write code in. This could be a text editor (e.g. Visual Studio Code, Notepad++, Sublime Text, Atom, GNU Emacs, or VIM), or a hybrid editor

(e.g.Dreamweaver or WebStorm). Office document editors are not suitable for this use, as they rely on hidden elements that interfere with the rendering engines used by webbrowsers.

Web browsers, to test code in. Currently, the most-used browsers are Firefox, Chrome,Opera, Safari, Internet Explorer and Microsoft Edge. You should also test how your siteperforms on mobile devices and on any old browsers your target audience may still beusing (such as IE 8–10.) Lynx, a text-based terminal web browser, is great for seeing howyour site is experienced by visually-impaired users.

A graphics editor, like GIMP, Paint.NET, Photoshop, or XD, to make images or graphics for your web pages.

A version control system, to manage files on servers, collaborate on a project with ateam, share code and assets and avoid editing conflicts. Right now, Git is the mostpopular version control system along with the GitHub or GitLab hosting service.

FTP program, used on older web hosting accounts to manage files on servers (Git isincreasingly replacing FTP for this purpose). There are loads of (S)FTP programsavailable including Cyberduck, Fetch and FileZilla.

An automation system, like Webpack, Grunt, or Gulp to automatically perform repetitivetasks, such as minifying code and running tests.

7.6 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

CHOOSE THE RIGHT OPTION.

1. **What is a CMS in web design?**
   a) Content Management System
   b) Creative Management System
   c) Content Mixing System
   d) Creatives Managerial System

2. **What do you understand by WordPress?**
   a) Software used to press text
   b) Text formatting software
   c) CMS (Content Management System)

d) Mail service

3. **Which of the following softwares could be used to build a website**

a) Power Point

b) Excel

c) Dream Weaver

d) ERP

4. Which is the most widely used email form script?

a) ASP

b) PHP

c) JSP

d) Perl CGI

7.7 SUMMARY

- A web page is often used to provide information to viewers, including pictures or videos to help illustrate important topics. A web page may also be used as a method to sell products or services to viewers. A website refers to a central location that contains more than one web page.
- Web page body is created using HTML, that HTML code can be created using an HTML editor and written by a human or generated using server-side scripts or other scripts. A web page created by a human often ends with a .htm or .html file extension and known as a static web page
- The terms "web developer" and "web designer" are often used synonymously, they do not mean the same thing. Technically, a web designer only designs website interfaces using HTML and CSS. A web developer may be involved in designing a website, but may also write web scripts in languages such as PHP and ASP.

7.8 KEYWORDS

HTML- Hyper Text mark-up language.

CSS- Cascading style sheet.

DBMS- Database Management System.

XLM- Extensive Mark-up language.

CMS- Content Management System.

7.9 SELF-ASSESSMENT TEST

1. What do you understand by web page?

2. Write about the content development of websites?
3. Write two characteristics of a web page?
4. Discuss about the any websites page that you like most on it ?
5. How colour scheme is important to design a web page?

7.10 ANSWERS TO CHECK YOUR PROGRESS

1. a)Content Management System
2. c) CMS (Content Management System)
3. c) Dream Weaver
4. b) PHP

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