B.A. MASS COMMUNICATION

4TH SEMESTER

BAMC -118

RADIO BROADCASTING

Centre for Distance and Online Education

Guru Jambheshwar University of Science & Technology

HISAR-125001

SUBJECT: RADIO BROADCASTING	
COURSE CODE: BAMC-118	LESSON NO.: 1
RADIO BROADCASTING	

LESSON STRUCTURE:

In this lesson, we shall discuss about radio broadcasting. We shall first discuss about the *basic concepts of broadcasting*. Then we shall focus on *signal processing*. The lesson structure shall be as follows:

1.0 OBJECTIVES:

The objectives of this lesson are as follows:

- *To Understand the Basic Concepts of Broadcasting, and*
- *To Study Signal Processing*

1.1 INTRODUCTION:

A *Danish* Scientist *Professor Hans Christian* discovered in 1819 that current created magnetic waves. Ten years after *Professor Alessander Volta* recorded the production of electricity by chemical means. Nearly six decades later *James Clark Maxwell* published his *theory of electromagnetism*.

Maxwell's theory predicted the existence of radio waves. German Physics *Professor Heinrich Hertz* worked on this in 1880s and proved that variations in electrical current could be projected into space as radio waves similar to light waves.

The theory of modern radio transmission is based on a paper published by *Hertz* in 1888.

Guglielmo Marconi worked further on *Hertz*'s research. Until this time the transmission of *Morse code* (telegraph) had required the laying of strings of wires from one reception point to another. *Marconi* set his radio waves in motion using Hertz's method. Thus wireless communication was born. Transmission of voice became possible with the development of *vacuum tube* by *John Flaming* in 1904. *Reginald Fessenden* and *Lee De Forest* later developed the *vacuum tube* further. *De Forest*'s *audion tube* was an improved version of *Fleming*'s *vacuum tube*. This became the most crucial key to voice transmission.

In this lesson, we shall discuss about the various concepts and equipment related to broadcasting of radio and television programmes.

1.2 PRESENTATION OF CONTENT:

The content of this lesson shall be presented as follows:

- *Basic Concepts of Broadcasting*
- *Signal Processing*

1.2.1 BASIC CONCEPTS OF BROADCASTING:

Broadcasting means making audio or audio-visual programmes reach far and wide. Such programmes are in generated, processed, and stored in either analogue or digital form. The only problem here is that these cannot be transmitted in the analogue of digital form. For transmitting these programmes, we first have to convert them in to electro-magnetic waves. Here we shall discuss about some basic concepts related to transmission and broadcasting.

FACSIMILE AND FIDELITY:

Sounds from a speaker are merely a copy (i.e., representations) of their original form. This is called *facsimile*. For transmission purpose, attempt is made to make exact copies of the original sounds. *Fidelity* is the reproduction of any sound with nearly or exactly the original quality. *High-fidelity* audio, or "*hi-fi*" is a close approximation of the original sound it represents. In fact much of the technical development of radio and television has been in search for *high fidelity*, i.e., finding better ways to make facsimile of the original sound or images.

TRANSDUCTION:

Transduction may be defined as the process of changing one form of energy into another. Transducers are devices, which can convert one form of energy into another. For transmission, we need to convert audio or audio-visual signals in to electro-magnetic waves. For example, a microphone converts physical (sound) energy into electrical energy. Most of the sounds or pictures we are getting at are homes through electric media involve at least three or four transducers. Say when a speech is recorded by using a microphone. The microphone converts our speech into electrical signals. The electrical signal thus converted goes to the loud speakers, which can convert the electrical signals back to sound. In between the microphone and the speakers the signal is processed through other transducers like the recorders. However, at each phase of transduction loss of fidelity is possible.

MODES OF TRANSDUCTION:

Broadcast transmission till 1980s used analogue signals. In this process, the broadcast information (audio or audio-visual signals) is converted from one form of energy to another. This means that to change the energy from physical to electrical impulses. To put it simply, the electrical impulses are analogous or very similar to that of the physical energy recorded.

These signals, known as analogue signals, tend to decay over time and space. This is because they merely represent the original signal and can never include all of the information present in the original sound. This problem is drastically reduced in *digital technology* in which each element of the audio and video signal is translated into its digital equivalent. Here each element of the audio or audio-visual signals is represented by a binary code. A binary code is one with only two values such as 0 and 1. This is called "*on-off*", "*Yes-No*" a "*open-shut*". The sound or pictures are transuded with the help of laser beams.

As the signal goes though many transducers, there is a possibility of losing some information. This is called *signal loss*. During multiple transductions, there is a possibility of addition of some unnecessary data, and unwanted interferences or noises. The *signal to noise (S/N) ratio* is a numerical representation of the amount of noise associated for any amount of signal recorded. Thus a signal-to-noise ratio of 55:1 means that for every 55dB of signal recorded 1dB of noise is present. *Decibel*

or dB is the unit of measuring loudness of sound. Analogue recordings have very low S/N ratio whereas it is very high for digital technology and therefore better quality recordings.

SOUND WAVES:

We hear sounds as variations, fluctuations, or variations detected by our ears and interpreted our brain. Similarly, we see images as variations, fluctuations, or variations detected by our eyes and interpreted our brain.

The vibration of air produced by sound source and the vibration of light is known as *oscillation*. And through *oscillation* only, we hear sounds or see images. Oscillation means the signals are traveling in a waveform.

Frequency is the number of waves that pass a given point in a given time. *Frequency* is measured in *hertz (Hz)* after the radio pioneer *Heinrich Hertz*. This is also measured in *cycles per second*. The human voice is capable of producing sound of a range of about 10,000 *hertz*, from the lowest bass voices at less than 100 *hertz* to the highest all voice at a frequency approaching 10,000 *hertz*.

Amplitude, which characterizes to loudness of a sound, is the height of the sound waves. The use of the terms frequency and amplitude is important since AM (amplitude modulation) and FM (frequency modulation) are two modes of radio broadcasting.

Amplitude Modulation signals use the "surfboard" method. Here the signal is placed atop the rest of the wave. There's a lot of *going off course* and *crashing* (static). However, AM transmissions travel over considerable distances.

FM radio stations use frequency modulation in which the radio signal travels like a torpedo, just under the outer surface of the wave. In this case, the oscillations emanate powerfully, and in a straight line, in the form of an excellent noiseless sound in the receiver. FM signals, like in television, are a line of short signals and have relatively short range because of the earth's curvature. It also has remarkable clarity of tone. Edwin H. Armstrong developed FM.

1.2.2 SIGNAL PROCESSING:

The following steps are involved in the signal processing of radio broadcasting:

- *Signal generation*
- *Signal amplification*

- *Signal transmission, and*
- *Radio reception*

SIGNAL GENERATION:

This step involves the creation of the necessary oscillations of electrical energy, which corresponds to the frequencies of the original physical (sound) energy. It may be obtained by using phonographs or microphone.

In side the microphone, the spoken word, sound, or music is mechanically recreated to produce electrical signals. Microphones, based on the construction, can be of three types:

- *Dynamic or moving coil,*
- *Velocity or ribbon, and*
- *Condenser or capacitor*

In a *dynamic or moving coil microphone*, the *diaphragm* is suspended between two electromagnets. In the centre of the microphone is *voice coil.* This is a coil of electrical wire, which moves up and down between the magnetic poles as sound pressure vibrates the diaphragm. This results in an electrical pattern in the mike wire coil analogous to the frequency of the sound.

Like the voice coil in the dynamic microphone there is a *metal ribbon* in *velocity microphones*. There is no diaphragm in velocity mic. The electrical signals are produced by the oscillations of the ribbon suspended between the electromagnetic poles.

In *condenser microphones,* an electrical device called *capacitor* replaces diaphragm. The capacitor, which is an electrically charged plate, produces electronic equivalent of sound. The pattern of electricity in the plate varies in relation to its distance from its back plate.

TAPE RECORDER:

The transduction of sound signals into electrical oscillations takes place in the shape of grooves on a record. Vibration formation on a diaphragm or coil in a microphone is also a similar process. In recorders, the audiotape consists of metal fillings suspended inside a plastic covering. When the tape moves in the recorder, the metal fillings pass the electromagnetic tape head where a hole called the *head gap* is located. The electromagnetic energy sent by the microphone reaches this hole through a wire. The head now emits a signal that is a facsimile of the original sound

and now it is in the form of a magnetic field. As the tape passes the gap, its microscopic metal fillings are charged and thus an analog signal is created.

Most tape recorders contain three different heads. First the tape passes the *erase head*, which returns the metal fillings to a noise free pattern. Erase head is an electromagnet charged with a neutral signal. Then the tape passes the *recording head*, which stores the new signal and finally passes the *playback head*, which "hears" the recorded signal by reversing the recording process.

The *playback head* sends a neutral signal through the gap, which is modulated by the signal on the tape. The electromagnetic patterns on the tape create oscillations in the gap and then they are sent for amplification in the form of electrical energy.

Professional audio facilities such as multi-track recorders are capable of handling *eight, twelve or even thirty-two separate sets of signals*. Radio stations use *open-reel machine*s (or *reel-to-reel machine*s), which employ two sets of *supply reels* and *the take-up reels*. Stations also use *audiotape cartridge players* or "*carts*" with only one reel. The tape winds past the heads and back onto itself.

Digital audio discs (or compact discs, CD) use a different means of signal generation known as *pulse code modulation* (PCM). Here the message is in the form of a series of charges according to the number of time it occurs in one second, that is the frequency.

SIGNAL AMPLIFICATION:

The audio signals are transduced or converted from physical energy to electrical energy. This is an analogue or digital facsimile. This facsimile has lesser resolution than the original sound. Thus this needs to be intensified by the special process. This process is called *amplification*. Amplification is don by an amplifier, which is a device that boosts electrical signals. Typically in electrical circuitry, drawing on an external power source increases the voltage of the current of an input signal. Such sources include transformers that produce more powerful output signals. Vacuum tubes and modern transistors are other devices used for this purpose. Amplifiers perform functions beyond increasing the power of sound source.

An *equalizer* is a *frequency dependent amplifier*. This can work within a specified range of frequencies to adjust the amplification. *Equalization* enables a sound signal to be fine-turned for its best tonal quality. An equalizer can also be

used to boost vocal sections out of the sound of an orchestrated passage. Equalizers can also be used to isolate and diminish, or remove poor sounding values of music. Simply put, unwanted noises in the high frequencies, such as whining from the equipment, can be filtered out through equalization so that they are not recorded. Of course, anything else at the frequency range will be filtered out, too. Therefore, equalization should not be used' to get rid of frequencies in the voice area while recording dialogues.

Automatic gain controls (AGCs) automatically adjust the *gain* in certain recorders so that the recording is neither too soft nor too loud. If the automatic gain control is not on, the operator should adjust the volume control manually to change the degree of loudness. The inherent noise or distortion in audio can be monitored and eliminated through volume unit meters, which indicate the changes in amplitude of the sound wave. The meter peaks or "pegs" at the point of highest amplitude.

Compressors, limiters, and expanders process the signal to allow for the maximum loudness possible without introducing noise or distortion. Compressors are used to decrease the sibilance (hissing sound). Limiters are utilized to record sound with very high but momentary peak periods (like crashing cymbals). Expanders make loud signals softer and vice versa to allow for an acceptable mix.

Amplification circuitry also allows adding electronic special effects like reverberation. Special amplifiers can create all sorts of effects from echoes to "sing along" doubling or tripling or even artificial choruses and deep echo chambers.

Some other devices are available to amplify audio signals. Phasers manipulate frequencies to create the illusion of stereo from mono signals. Pitch changers can turn an out-of-time musician into an accomplished soloist, and tape recorder motors can be manipulated to record sounds backward and to speed up or slow down recordings.

MIXING CONSOLES:

The audio console or the audio board is the mixing board. It is the mixing link in audio production, which is the central nervous system of the audio facility. Various sound signals are input, selected, controlled, mixed, combined, and eliminated by the audio console.

To input a sound source is the first function of the audio console which usually consists of an even number of *sliding bars* called *inputs*. Common are eight, ten,

twelve, twenty-four, and thirty-two input boards. Some inputs correspond to one and only one sound device. Others use select switches and patch-bays to allow for a single input to control as many as four or five different sound signals. A rotating dial controls each input. This dial is called a *pot* (short for *potentiometer*). A more commonly used control on an audio console is a *sliding bar* called a *fader*. More elaborate boards allow for equalization and special effects. Boards also allow for echo source to be measured and for the output of various signals to be amplified.

TRANSMISSION OF SIGNAL:

The electromagnetic spectrum consists of the electromagnetic radiation present throughout the universe. This spectrum has made possible the process of transmission of signals. And with the process of modulation the generated electrical signals are superimposed or attached "piggyback" on natural waves. The signal produced by a radio station on an assigned frequency is called a carrier wave. The radio signal is created by varying the carrier wave slightly, in correspondence with frequencies of the signals the station meant to transmit.

A tuner tuned to the precise middle of the carrier interpretes these oscillations and reproduces them as sounds in the speaker system. The radio waves, which are utilized for broadcasting and related transmissions is only a small part of the electromagnetic spectrum. The electromagnetic spectrum consists of the *Radio waves* (up to 300, 000 MHz), the I*nfrared rays* (up to 10^7 MHz) the *visible light spectrum* (up to 10^{13} MHz), *Gamma rays* (10^{16} MHz) and Cosmic rays (10^{18} MHz).

In the beginning, radio broadcasting was done using the low end of the wave spectrum known as medium waves in an area ranging from 0.3 to 3 megahertz (1 megahertz, MHz is equal to one million Hz i.e. cycles per second). The frequencies raging from 3 to 30 megahertz are known as the high frequencies and are used for long-range military communications etc. Since high-frequency waves can be used to transmit signals over greater distances. International short wave stations such as BBC, the Voice of America and Radio Moscow have been using this part of the spectrum for many years.

The *very high frequency or VHF band* ranges from 30 to 300MHz and is utilized for telecommunications applications. The *ultra high frequency (UHF) band* is used for TV stations, weather satellites, etc. UHF band spans from 300 to 3000

megahertz. Microwave ovens which be used for to cook on food are modulated by UHF radiation.

Super high frequencies (SHF) band range from 3000 to 30,000 MHz and extremely high frequencies (EHF) range from 30,000 to 300,000 megahertz. Commercial satellites, news satellite, and many other new applications utilize these.

The use of the above waves must be policed or controlled for effective worldwide communication. This is because the spectrum is a physical entity that crosses national boundaries. Nations meet in international platforms to decide on the proper allocation of the spectrum space. The International Telecommunication Union (ITU) lays down radio regulations as well as technical and operating standards. In 1959, the World Administrative Radio Conference (WARC-59) in Geneva evolved a detailed procedure for coordination of frequencies in the high frequency brands for broadcasting. However, with the increase in the number of high power transmitters, coordination of medium frequencies has become rather complicated.

In India, sound broadcasting and related transmission are carried out in a low frequency range of 150 to 280 MHz (kilohertz); medium frequency of 525 to 1605 MHz; high frequency of 3 to 30 MHz and 98 to 102 MHz and 106 to 108 MHz.

ELECTROMAGNETIC SPECTRUM:

	Spectrum	Megahertz
1.	Radio waves	300,000
	EHF	
	SHF	
	UHF	
	VHF	
	Short	
	Medium	
	Long	
2.	Infrared range	10^7
3.	Visible light	10^8
	Violet	
	Indigo	
	Blue	
	Green	
	Yellow	
	Orange	
	Red	
4.	Ultraviolet rays	10^9-10"
5.	X-ray	10^{13}
6.	Gamma rays	10^{16}

7.	Cosmic ray	10^{18}

RADIO WAVES:

	Radio wave	Megahertz
1.	Very low	0.03
	Very long range	
	Military communication	
2.	Low	0.3
	Navigation signals	
	Long wave	
3.	Medium	3
	AM channels	
	Ham radio	
4.	High	30
	Short-wave	
	Ham radio	
5.	Very high	300
	FM channels	
	VHF television	
	Air navigation	
6.	Ultra high	3,000
	UHF television	
	Radar	
	Weather satellite	
7.	Super high	30,000
	Radar	
	Ku and CL and communication satellites	
	Air navigation	
8.	Extremely high	300,000
	Military communication	
	Developing technologies	

Radio transmitters can generate three types of waves:

- *Sky waves*
- *Ground waves, 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.

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 particular suited to ground and sky wave propagation. AM stations have generally located their transmitters in low land area. 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 sky wave. 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.

RECEPTION OF RADIO WAVE:

The reception of the audio signal is the step after transmission. During reception, the radio waves are picked up by the radio sets and transduced by the speaker into sound waves. The characteristics of the electromagnetic spectrum and the different modulation techniques have led to the development of different types of radio receivers. The various types of receivers may be classified as:

- *AM receivers*
- *FM receivers*
- *Multi-band receivers*

AM Receivers:

- Tall and telescopic antennas are not required due to the effectiveness of the ground waves.
- Good signal may be received even when the radio is in motion.
- The phenomenon of the sky wave enables listening over long distances.

However AM receiver are not free from limitations.

- AM radio is prone to interference and noise.
- There is limited frequency response.

FM Receivers:

- The noise free dynamic range of FM makes it a natural choice for the hi-fi enthusiasts.
- FM receivers do not have amplifiers or speakers attached to them; there are separate tuners, which need to be plugged into the hi-fi system.

FM receivers are limited by:

- The FM signal requires a clear path or *line of sight* from the transmitter to the receiver.
- Requires a long antenna.
- FM signals tend to be blocked by buildings, mountains and moving objects.

Multi-band Receivers:

Today most radio receivers have both AM and FM bands. In addition, many radios offer access to a range of other bandwidths that provide various radio services. More popular are *Radio with TV*. Sound digital tuner is an exciting and useful feature of many radio receivers. Digital tuners display a stations frequency in real numbers. The numbers may be presented on a *liquid crystal display* (LCD) or on a *light emitting diode*. Digital tuners perform impressive functions. When equipped with a numeric keypad, they enable the listener to programme specific frequencies. They enable clock radios and radio-tape recorder combinations to operate with up to the minute accuracy.

SIGNAL STORAGE:

This stage is the concluding or final stage. The audio signals that were generated, transduced, modulated and transmitted are stored for playback or rebroadcast by sound studios, radio stations, and the public.

There are many storage devices. Most of these are recorders. *Wire recorders*, which are similar in design and look to tape recorders, store signal on a length of special wire. *Magnetic tapes* are suitable for quality broadcast and are easy to edit.

The three most common tapes in use today are *open reel (reel-to-reel), cassette and cartridge*. *Phonograph recording* has been around since the turn of the century with various record formats including 33-1/3 rpm (revolution-per-minute) and 45 rpm 7-inch "donuts".

Compact Disc (CD) recording has become a common phenomenon today. Digital audiotapes (DAT) are also used in professional audio facilities. In the coming years DAT will play an increasing role in radio and other audio programmes.

1.3 SUMMARY:

- Radio and TV programmes are in generated, processed, and stored in either analogue or digital form. However, these cannot be transmitted in the analogue of digital form. For transmission these programmes need to be converted in to electro-magnetic waves.
- *Frequency* is the number of waves that pass a given point in a given time. *Frequency* is measured in *hertz (Hz)* after the radio pioneer *Heinrich Hertz*. This is also measured in *cycles per second*. The human voice is capable of producing sound of a range of about 10,000 *hertz*, from the lowest bass voices at less than 100 *hertz* to the highest all voice at a frequency approaching 10,000 *hertz*.
- *Amplitude* characterizes to loudness of a sound. This is the height of the sound waves. The use of the terms frequency and amplitude is important since AM (amplitude modulation) and FM (frequency modulation) are two modes of radio broadcasting.
- Amplitude Modulation signals use the "surfboard" method. Here the signal is placed atop the rest of the wave. There's a lot of *going off course* and *crashing* (static). However, AM transmissions travel over considerable distances.
- FM radio stations use frequency modulation in which the radio signal travels like a torpedo, just under the outer surface of the wave. In this case, the oscillations

emanate powerfully, and in a straight line, in the form of an excellent noiseless sound in the receiver.

- The steps involved in the signal processing of radio broadcasting are: signal generation, signal amplification, signal transmission, and radio reception.

1.4 KEY WORDS:

Facsimile and Fidelity: Sounds from a speaker are merely a copy (i.e., representations) of their original form. This is called *facsimile*. For transmission purpose, attempt is made to make exact copies of the original sounds. *Fidelity* is the reproduction of any sound with nearly or exactly the original quality.

Transduction: Transduction is the process of changing one form of energy into another. Transducers are devices, which can convert one form of energy into another. For transmission, we need to convert audio or audio-visual signals in to electro-magnetic waves. For example, a microphone converts physical (sound) energy into electrical energy. Most of the sounds or pictures we are getting at are homes through electric media involve at least three or four transducers.

Frequency: This is the number of waves that pass a given point in a given time. *Frequency* is measured in *hertz (Hz)* after the radio pioneer *Heinrich Hertz*. This is also measured in *cycles per second*. The human voice is capable of producing sound of a range of about 10,000 *hertz*, from the lowest bass voices at less than 100 *hertz* to the highest all voice at a frequency approaching 10,000 *hertz*.

Amplitude: This characterizes to loudness of a sound, is the height of the sound waves. The use of the terms frequency and amplitude is important since AM (amplitude modulation) and FM (frequency modulation) are two modes of radio broadcasting.

Amplitude Modulation: Here signals use the "surfboard" method. Here the signal is placed atop the rest of the wave. There's a lot of *going off course* and *crashing* (static). However, AM transmissions travel over considerable distances.

Frequency Modulation: FM radio stations use frequency modulation in which the radio signal travels like a torpedo, just under the outer surface of the wave. In this case, the oscillations emanate powerfully, and in a straight line, in the form of an excellent noiseless sound in the receiver. Edwin H. Armstrong developed FM.

Stages of Signal Processing: The steps involved in the signal processing of radio broadcasting are: *signal generation, signal amplification, signal transmission, and radio reception.*

Dynamic or Moving Coil Microphones: Here the *diaphragm* is suspended between two electromagnets. In the centre of the microphone is *voice coil.* This is a coil of electrical wire, which moves up and down between the magnetic poles as sound pressure vibrates the diaphragm. This results in an electrical pattern in the mike wire coil analogous to the frequency of the sound.

Velocity Microphones: There is a *metal ribbon* in *velocity microphones*. There is no diaphragm in velocity mic. The electrical signals are produced by the oscillations of the ribbon suspended between the electromagnetic poles.

Condenser Microphones: Here an electrical device called *capacitor* replaces diaphragm. The capacitor, which is an electrically charged plate, produces electronic equivalent of sound. The pattern of electricity in the plate varies in relation to its distance from its back plate.

1.5 SELF-ASSESSMENT QUESTIONS (SAQs):

1. Write a detailed note on the basics of broadcasting.
2. Describe in detail how signals are processed?
3. Write a detailed note on amplitude modulation and frequency modulation.

1.6 REFERENCES / SUGGESTED READINGS:

- Keith, Michael C & Krause, Joseph M. (1989) — **“The Radio Station”.**
- Chatterji, P.C. (1993) — **“ Indian Broadcasting”.**
- Dilliard (1990) — **“Television Journalism and Broadcasting”.**
- Bhatt, S.C. (1995) — **“Broadcast Journalism”.**

SUBJECT: RADIO BROADCASTING	
COURSE CODE: BAMC-118	**LESSON NO.: 2**
ELECTRONIC MEDIA PRODUCTION	

LESSON STRUCTURE

In this lesson, we shall discuss the basics of radio production. We shall start with radio production formats. Then we shall focus on basic equipments for radio production, stages of radio programme production, and the different types of radio programmes. We shall also briefly discuss about writing for radio.

In the second part, we shall discuss the basics of television programme production. We shall start with an introduction to television programme production. Then we shall focus on the stages of television programme production, and the different types of video formats. We shall also discuss about the terminology used in television production. The lesson structure shall be as follows:

2.5 Self-Assessment-Questions (SAQs)

2.6 References/Suggested Reading

2.0 OBJECTIVES:

The objectives of this lesson are as follows:

- *To study about the various radio production formats*
- *To study about equipments for radio production,*
- *To study about stages of radio programme production,*
- *To study about types of radio programmes,*
- *To study about writing for radio,*
- *To get an Introduction to Television Production,*
- *To study about the Phases of Television Production,*
- *To study about the Pre Production Stage,*
- *To study about the Production Stage,*
- *To study about the Postproduction Stage,*
- *To know about some Video Formats, and*
- *To Know Some Terminology Used in Television Production.*

2.1 INTRODUCTION:

Electronic media of communication bring into our homes audio and video signals in the form of various programmes. These programmes, which come on air as sound or both picture and sound, are either live or are already recorded or shot, processed, and transmitted. Electronic media viz. television, radio, and film (or motion picture) share the following attributes:

- *Immediacy:* These media can present topical, contemporary material live to the audience immediately.
- *Impermanence*: Programmes brought by these media are perishable images and sounds.
- *Diversity*: They bring a variety of programme material, which appeals a wide range of audiences.
- *Flexibility*: Material can be recorded edited, and duplicated for multiple playbacks.

In this lesson, we shall discuss about the basic aspects of radio and television programme production.

2.2 PRESENTATION OF CONTENT:

The content of this lesson shall be presented as follows:

- *Radio production formats*
- *Equipments for radio production*
- *Stages of radio programme production*
- *Types of radio programmes*
- *Writing for radio*
- *Television Production: An Introduction*
- *Phases of Television Production,*
- *Pre Production Stage,*
- *Production Stage,*
- *Postproduction Stage,*
- *Video Formats, and*
- *Terminology Used in Television Production*

2.2.1 RADIO PRODUCTION FORMATS:

Many radio programmes are live. Some programmes on radio are recorded first and broadcast later. Some programmes are studio based, while others are recorded on outside locations. Here we shall discuss about a few different varieties of radio production formats:

LIVE OR RECORDED RADIO PROGRAMMES: The programmes on radio and television can be live, pre-recorded or a combination of both. The nature of production calls for whether a programme will be produced live or recorded in advance and used later.

Live production involves the risk of production errors, as there are no "second chances". It has to be right the first time, which is the only time. However, live production is cheaper than recorded production techniques and sometimes easier and quicker.

Recorded productions allow supervision and control over quality. In this method, first recording of programmes is done. Editing and postproduction are done at a later time. This is an attempt at

enhancement to further refine production value and quality while shooting. This can also combine with live production method. Portions or segments of a programme can be recorded, edited, and processed in advance and incorporated into a studio production using live talent.

STUDIO OR REMOTE (OUTSIDE ON LOCATION): Programmes can be produced with in the controlled environment of an indoor studio, which offers the required settings of a programme. Studio settings offer personnel control, light control, temperature control, sufficient power supply, and access to supplementary production personnel, equipment accessories and spare parts, and even telephones and change rooms.

Production can also be done at a temporary remote location. A unique setting can be achieved by thoughtful selection, planning and full use of a remote outside location. The realism and detail required for the quality and success of a production can also be obtained. However, in such a situation some production requirements, such as extensive lighting or elaborate sets are eliminated.

A combination of studio and remote production is also possible. Most newscasts combine anchors in the studio with reporters in the field. The anchor introduces a story from the studio and the reporter provides the details from the field.

OTHER PRODUCTION FORMATS:

Audio production can be carried out in many ways depending on the types and source of programmes. *Local live* production employs station's own announcers or newscasters locally and play records and tapes, which they themselves own. *Live-assist* production is one way where stations retain local announcers and disc jockeys as the backbone of the programme and uses syndicated programming, such as reels of taped (prerecorded) music and satellite delivered music services.

In *semi automation* production a local radio station relies on the services of the syndicated programme producer. The music is typically played on large tape machines. When a break point for a programme announcement is reached, smaller cartridge tape machines are triggered to play by a sub audible cue tone on the master tape.

Turnkey automation refers to fully automated radio stations, which consists largely of a satellite dish and a control board. The satellite disk downlinks radio programmes. The services may also be localized such that new information is telephoned to the programme producer in time for the announcers many miles away to prepare the inserts.

2.2.2 EQUIPMENT FOR RADIO PROGRAMME PRODUCTION:

The basic equipment to produce audio programme include the following:

- *The studio desk (mixer console or control board or control panel)*
- *Microphones*
- *Turntable*
- *Compact Discs and Records*
- *Audiotapes*
- *Music and Sound effects.*

THE CONSOLE: The control board or console processes the sounds and voices during recording, editing, and dubbing. This mixes together the various programme sources to form the broadcast output. This is located in the central control point or control room. Three types of circuit functions are operated.

Programme circuits: A series of channels, their individual volume levels controlled by separate rotary faders.

Monitoring circuits: Visual (meter) and aural (headphone) means of measuring the individual sources or channels as well as the final mixed output.

Control circuits: Provision of communication with studio or outside by means of "talk back" or telephone line.

MICROPHONE: A microphone (mics, pronounced *myke*) is a transducer, which converts acoustic energy into electrical energy. Several types of microphones are available with audio pickup pattern characteristics designed to meet various recording requirements and situations. The directional property of microphones, which is also called the pickup pattern, is important for selecting the right kind of microphone. According to the pickup patterns, microphones can be classified as:

- Unidirectional microphones are appropriate for one or two people speaking side by side. Background noise is undesirable. These are also called cardioid mics because of their heart-shaped pick-up pattern.
- Bi-directional microphones are used when two people directly facing each other.
- *Omni-directional microphones are used for picking up a large number of people and are excellent for gathering background noise.*

Stereo recording requires specially designed stereo microphones. It can also be achieved by using at least two microphones. One such approach is *M-S (mid-side)* miking. A bi-directional microphone picks up sound to the left and right and a super cardioid microphone picks up sound to the front. The output of both microphones is fed through a complicated circuit. *X-Y miking* is another method of stereo recording. Two cardioid microphones are placed next to each other. One angles to the left at a 45-degree angle and other to the right at 45 degree. This way both the microphones pick up sound from the center.

TURNTABLE: A turntable picks up information recorded on a disc or record and sends this information to the console for amplification, mixing, processing, and integration with other sound elements.

COMPACT DISCS AND RECORDS: Vinyl records or LPs are being replaced by high quality digital recordings made on compact disc. In playing a disc, most control desks have a "pre-fade", "pre-hear" or "audition" facility which enables the operator to listen to the track and adjust its volume before setting it up to play on the air. With a record, a glance at the grooves will often be sufficient to indicate whether there is a wide variation in dynamic range.

AUDIOTAPE: Sounds can be recorded in the field or in the studio onto audiotape at standard speeds. The audiotape used in studio may be in the form of continuous loop cartridges, or *carts,* or materials may be recorded on reel-to-reel audiotape machines. Digital Audio Tapes (DAT) record the signal in digital form in which the original electrical variations are represented by a series of pulses or bits of information.

MUSIC AND SOUND EFFECTS: Music and sound effects may be produced and recorded in CD or audio tape and may also be prerecorded on disc or audio tape and integrated into the programme material using the console or control board.

Voice Terms: The terminology used for production describes the placement 9place of origin of voice) and quality of voices. The voices are indicated using easily understood designations, for instance, *Voice 1, character's name* or *Announcer # 1.*

- *On mic* (*on mike*): A voice or character is heard at a normal distance from a microphone.
- *Off Mic*: When we want the voice to be heard as though coming from a distance or from the back of a room we use this term.
- *Fading on or fades on*: We write this when we want the voice to sound as though is approaching the centre of action in the minds eye of the listener. Fade off or fading off could indicate the reverse process, where the voice starts at a normal distance from the microphone and then slowly moves away.
- *Reverb*: is written to create suspense or heighten a mysterious mood when we want the voice to be heard with a slight echo or reverberation. It is normally written after the talents designation. To create the illusion of a telephone conversation, the notations "filtered a "behind barrier" can be used, or simply indicated as heard through a telephone,
- *SFX:* The common abbreviation for sound effects is "SFX". For sound effects indicate both the source and the nature of the material, for instances "CART: MUSIC UP FULL FOR FIVE SECONDS AND THEN UNDER". *Music under* or *sneak under* is used when the music or the sound effect is heard in the "background" (bg.) and then is heard at full volume after a character finishes a particular word.
- *Segue:* We write, "segue" where one selection ends and the next selection begins immediately. We write "Cross fade" when one selection gradually fades out and the next selection gradually fades in.
- *Ad lib:* Sometimes audio scripts include "ad lib", which allows character or voices momentarily to create their own words keeping with the general tune, mood and purpose of the script.

2.2.3 STAGES OF RADIO PROGRAMME PRODUCTION:

Radio productions are planned in three stages.

PRE-PRODUCTION:

This is the planning and development stage. This begins with the generation of a script. Unless a script is developed it is difficult and there will be confusion on what type of programme you are producing. The script contains instructions and guidelines for the production of the programme.

PRODUCTION: The second stage is *production*. All the material for the programme is recorded or organized at this stage. Selecting and positioning of the microphones, the type of tapes to be used, and selection of various sources of sound through the mixer are all part of this stage.

POSTPRODUCTION: This stage generally includes editing. Sounds recorded during production and dubbing if required, are the principal focus of postproduction. Putting together the previously recorded sound and selection of sound are important. The purpose of editing can be summarized as:

- To arrange recorded material into a more logical sequence.
- To remove the uninteresting, repetitive, or technically acceptable portion.
- To compress the material in time.
- For creative effect to produce new juxtaposition of speech, music, sound and even silence.

2.2.4 WRITING FOR RADIO:

We know that script is the backbone of production. So writing is an essential part of it. We write what type of sound would be required at a given situation and what would follow. Sound is the entire means of communication in radio. Sounds help create and enhance mental images.

Sounds have the unique capability of creating an environment for the listener. Through the creative use of various writing and production techniques, entire worlds can be created in the human mind. Many techniques are availed to create an environment with sound.

- *Language:* The primary goal of language is to communicate ideas and information to be easily understood. The selection and using words and the combining of words into meaningful sentences are important for good production.
- *Words:* Words are the primary tools for the expression of thoughts, ideas, and emotions, regardless of the medium. Words have meaning and power. Words need to be selected carefully. Use words that comes close to reality. Informal, rather than formal words are preferred.
- *Sentences:* Sentences are the principal units of organised thought. The keys to construct effective sentences are clarity, simplicity, conversational style and conciseness.

2.2.5 DIFFERENT RADIO PROGRAMMES:

NEWS AND SPORTS:

Newscasts and sportscasts represent a station or network's largest daily commitment of time, effort, personnel and facilities. Several steps are followed to develop news stories.

- The idea for a story is suggested by a reporter,
- The idea in evaluated.
- The logistics governing the story are identified and finalized.
- The story is produced into finished form.

The process of writing and structuring the first version of story should include the following:

- Reading the source material carefully and thoughtfully. What is newsworthy? What is the essence of the story? What impact it might have on the audience?
- Highlighting the main points on the original source material.
- Tell the story informally to a friend or a fellow newsroom reporter
- Determine how the story can best be told.
- Write the first draft.
- Arrange the structure, lead, sentence pattern, ending, etc.
- Check your copy against the original source.
- Revise the copy

DOCUMENTARIES AND FEATURES:

A documentary presents, facts, based on documentary evidence about a relevant subject from real events, persons or places to reflect, interrelate, creatively interpret or comment on current concerns and realities. The feature programme on the other hand need not be wholly true in the factual sense. It may include folk song, poetry & fictional drama to help illustrate its theme.

Reality is the basic requirement for a documentary. Documentaries may be classified as information, interpretation, or persuasion according to the ultimate objective. They may also be combined.

To develop a subject (idea) of a documentary the following process is normally followed:

Information
to
Knowledge
to
Understanding
to
Expression.

Some suggestions are given for the production of documentaries.

- Prepare as detailed an advance script as possible.
- Divide programme elements into those that are under your control and those that are not.
- Write narration involving the audience.
- Provide narration that sounds natural and conversational.
- Avoid long lists, unnecessary statistics, complex terms and jargons and hackneyed expressions.
- Make narration clear, precise, and easy to understand.
- Do not inundate the programme with too much narration.
- Do not use narration when a sound will communicate the information or mood more meaningfully.

TALK PROGRAMMES (INTERVIEWS):

The general programme category of public affairs includes the *talk programmes, interviews, newspaper programmes, and discussions*. When regular broadcasting began in the 1920s, among the first types of programmes to appear on radio networks were those of featured

interviews. The aim of an interview is to provide facts, reasons, opinions in a particular topic in the interviewee's own words, so that the listener can form a conclusion as to the validity of what the interviewee is saying.

Electronic media interviews are done under a variety of circumstances - live or recorded and edited for later use, in the studio, on the telephone, or on a remote location in the field. Interviews can be divided into three types the information interview, the opinion interview, and the personality interview.

What ever is the type of interview; the following methods of approaching the task can be used.

- *The style of the interview*
- *The wishes and comfort of the guest.*
- *The time available for preparation.*
- *The nature of the topic.*
- *The interview policies of the station - some prefer the spontaneous, unrehearsed method while other prefer more structural and predictable interview situation.*

2.2.6 TELEVISION PRODUCTION- AN INTRODUCTION:

The word *television* means "to a see at a distance". In TV broadcasting system, the visual information is recorded and converted in to an electric signal, which is transmitted to the receiver. At the receiving end, the video signal is converted back in to the images on the screen of the picture tube (TV set).

Much similar to radio broadcasting, television originally was conceived as another method of broadcasting entertainment and news programmes but with pictures. Commercial broadcasting turned out to be the largest field in the application of television.

The ability to reproduce pictures, text material, graphics, and visual information has become so useful that we can watch a programme from a foreign country relayed by satellite or play back a video cassette recorder (VCR), or a video game can be connected to the TV receiver.

2.2.7 STAGES OF TELEVISION PROGRAMME PRODUCTION:

Essentially the production of television programmes encompasses three basic stages or phases. These are:

- *Pre-production,*
- *Production, and*
- *Post production.*

These phases may also be called as: planning, shooting or recording, and editing.

Pre-production is the stage of development and planning that is executed before the actual shooting phase of production. Pre-production begins with the generation of a script without which developing a budget, hiring the crew, planning a shooting schedule, selecting locations are almost impossible.

All the material for the programme is shot in the production stage. Shooting is done as envisaged in the production script. The scenes and shots required for the programme are recorded or obtained at this stage.

The various shots are joined in a logical, pleasing and meaningful order during postproduction. Each phase is crucial to the phase that follows. Inadequate pre production almost guarantees a poor production, and a poor production is seldom "saved" or improved upon in the postproduction.

The principal focus of postproduction is editing the images and sounds recorded during production. The phase involves giving finishing touches to the images, sound and special effects. Dialogue that may have been poorly recorded during production may need to be rerecorded or dubbed. If the script calls for voice-over narration or stock footage to complete a particular sequence, these are handled during postproduction.

Eventually, a version of the programme that contains picture, dialogue, music, sound, special effects, and any other necessary elements is put into the final form, which can now be submitted for transmission.

Each of these phases is explained in detail in this lesson.

2.2.8 PREPRODUCTION STAGE:

SCRIPT WRITING:

The Concept: *Also* called the idea, premise, or synopsis, a script is a written account describing the basic idea of the programme story. It presents a thumbnail sketch of the story and is often used to provide the producer or the director with a quick means of evaluating the overall scope of the programme story. The argument for beginning the productions with a brief story idea is that if a short concept can't catch interest, it hardly makes sense to develop that idea into a full-length script.

Example of concept (TV serial Hum Log)

> The average lower middle class family is under grate strain of the forces of modernization. Parents and children live under profound generation gap. The society needs to be shown a mirror, thereby making these people aware and conscious of certain problems. At the same time there has to be an attempt to provide options for behaviour and resolution of conflicts. People need some guidelines and what can be better than telecasting an entertaining serial on television.

The Scene Outline: *The* scene outline is a list in numerical order of all the scenes without dialogues or elaborate descriptions. It is an excellent tool for listing the plot, which is not necessarily the same thing as the story.

The Treatment: The treatment is a prose description of the story. It reads like a story, describing the action in detail and provides the kind of visual imagery. It gives the first indications of where dialogues will be needed and builds on and amplifies the characters, action and motivation suggested in the outline. The treatment is one of the most important stages in script writing.

The Master Scene Script: *The* master scene script is the translation of the treatment into script form. Using the treatment as a guide, a master scene script creates a heading for each scene (for examples, INTERIOR OF THE CENTRAL HALL - AFTERNOON).

The Shooting Script: The shooting script is the final stage of script writing. The shooting script is usually the director's responsibility. The shots in the shooting script are numbered consecutively. In addition to the

scene headings, descriptive material, and dialogue from the master scene script, the shooting script provides specific instructions about camera angles, positions, and movements. The shooting script also contains information about the transitions between shots or scenes.

Some directors supplement the shooting script with drawings called *storyboards.* These are diagrams of the main scenes and tell the entire story in a visual format on paper. Storyboards depict the scenes and also indicate the camera positions.

The Budget: Within the professional world the budget is the governing force of all productions. Estimations of what the programme will cost must be accurate. Although the size of the budget can affect the script, the usual procedure is for the budget to be derived from the script.

2.2.9 PRODUCTION STAGE:

PRODUCTION PERSONNEL:

Producer: The producer assumes responsibility for the entire television production. Depending on the type of production and facility involved, these responsibilities are combined with those of the director, the writer, or both.

The Director: The director coordinates the efforts of the technical crewmembers and the performance of the television talent. The director executes the production designed by the producer and conceptualized by the writer.

The Writer: Basically, the writer conceptualizes and formulates the essential television elements into proper script to accomplish specific objectives.

2.2.10 POST PRODUCTION STAGE:

The need for editing was apparent, even in the early days of the movie image. At first it was done by turning the camera off after one shot, then repositioning and turning it back on for the next shot. The film was processed and then projected with all the scenes in the same order in which they had been shot. Real editing began when they turned the camera off and on several times in one reel, processed the film, and then

cut the shots apart and glued material back together in a shorter form or different order. Then video editing started. It too began with physical cutting and splicing of tape.

On-line and Off-line Editing: On-line editing is analogous to cutting the film negative whereas off-line editing has been akin to film editing that uses work prints.

Right after tapes are shot, they are dubbed to work print tapes that are then used to make all the editing decision. The work prints are viewed in order to determine the edit-in point and edit-out point. When the points are marked, their time code numbers will be stored in the computer which keeps track of all the changes in what is called an edit decision list (EDL).

Linear and Nonlinear Editing: Originally, all video editing consisted of recording shots one after another from the beginning of the programme to the end in a linear fashion. If someone finished editing an entire production and then decided that the second edit should be two seconds shorter, there was no easy way to fix the problem. This process also suffers from *generation loss* because signal information is lost or contaminated when material is dubbed from one analog tape to another.

Computer based *nonlinear* electronic editing was developed in the mid 1980s. It is also known as *random access* editing. On a computer if your decide to more a paragraph from page 2 to page 152 from a word processing programme, a few key strokes will accomplish the task. Similarly, in nonlinear editing scenes can be trimmed and moved quickly and easily.

Cuts only Linear Editing: A cut only system is the most basic and the simplest editing system, which can butt one video image and its dialogue against another. It cannot execute *wipes* and dissolves since it cannot show two pictures at a time.

Control Track Editing: This process involves using the video control track. An operator uses the controller to mark the *edit-in* and *the edit-out points* on the tape. Then the controller backs up both machines an equal amount so that they run at same speeds, running frames in sync, counts control pulses to the edit-in points, and then starts the edit.

Time Code Editing: Time code is a digital numerical address that includes the hour, minute, second and also the number for each frame. Time code can be recorded on a *linear audio* track, which is referred to a s *longitudinal time code (LTC)*. The item code can also be placed in the vertical interval, which is referred to as *vertical interval time code* (VITC).

This is the retrace area where the scanning stops at the bottom of the frame and returns to the top of the frame. Drop-frame time code is a more advanced system and corrects the error accumulated in LTC and VITC. This system corrects the time code frame counter by systematically dropping just enough frames to match the clock time and the time code address numbers.

EDITING EQUIPMENT:

Cuts-only video editing involves two video tape recorders, one or two monitors, and an edit controller. One videotape recorder, called the source deck, contains the original camera footage that is to be rerecorded. The other recorder, called the edit deck, is the machine an to which selected materials from the source deck are edited. One monitor shows the output of the source deck; the other shows the output of the edit deck. The edit controller is used to mark the editing points and cue the decks to execute the editing decisions.

Advanced editing can be achieved by incorporating other equipment like the *switcher, which* can generate transitions. The *A-B roll* uses two sources to supply one edit machine, *special effects generator* (SEG), and *character generator* (CG), which can generate graphics.

Desktop computer assisted editing has changed the world of editing. One advantage of using desktop computer for editing is that the same computer can be used for graphic programmes, special effects, audio, shot logging and other production process. This makes postproduction more of a "one stop" process that is less time consuming than postproduction has been in the past.

2.2.11 VIDEO FORMATS:

The production begins with the video camera and recorder. Here you need to know the video camera and recorder (or camcorder), camera mounting equipment and lenses. Different video formats are also studied.

FORMATS: Ampex, in 1950s, used a tape that was 2 inches wide. Portable configurations came only in the 1970s with the introduction of U-matic, which consisted of a camera and separate videocassette recorder that used a 3/4-inch tape.

Two 1/2 inch formats introduced two years later by Sony's Betamax and JVC's VHS were not compatible with U-matic due to the difference in tape size; they also were not compatible to each other because the way the tape wound around the recording heads, and the speeds were different.

In the early 1980's came camcorder system-a combination of the camera and the video tape recorder. Sony's Beta-cam and JVC's and Panasonic's M-format though used 1/2 inch tapes were not compatible again. Video-8 introduced by Sony used a tape that was 8 mm wide (about 1/4 inch) became the most portable format.

The formats that came in the 1980s were improved and yielded to new equipment: U-matic SP, Super VHS ((S-VHS), Beta-cam SP, MH-II and Hi-8.

All the formats mentioned above are designed on the analog technology. The latest developments are digital video recorders which give much better results.

LENSES: Lenses gather light reflected by a subject and concentrate it on the imaging device. Most lenses on TV cameras and camcorders are zoom lenses (more properly called variable focal length lenses). Other lenses, called fixed lenses (or prime lenses) are capable of capturing visuals only one distance. Lenses, which show shots that appear to be magnified, are called telephoto lenses. Those that show views roughly as the eye sees them a normal lenses. Those with a view wider than the human eyes are called wide-angle lenses.

DEPTH OF FIELD: Viewers' attention within the frame can be directed by manipulating the depth of field. A shallow depth of field (a shallow focus) isolates a subject in one plane and throws all other out of focus. A large

depth of field allows the viewers eyes to roam throughout every plane of action.

LIGHT AND FILTERS: Light is the key to recording an image on videotape. To obtain the correct exposure the amount of light reaching the electronic imaging device is controlled; too much light will result in an overexposed image; too little light to an under exposed image. A light meter is used to measure the amount of light falling on or reflected by the subject.

Light meters may be 'incident light meters' that measure the amount of light falling in a particular talent or area of the set; 'reflected light meters' measure the amount of light reflected by the subject, providing on overall light reading for the entire scene. Best feature of light can be obtained by using a combination of both reflected and incident light meters.

THE COLOUR OF LIGHT: In making quality images you need to know the colour of light. Electromagnetic energy is measured according to wavelengths. Our eyes see different wavelengths as different colours. A colour temperature scale was developed to provide a precise and accurate measurement of different colours of light. The scale in measured in degree Kelvin (K). Human eyes have the ability to compromise for large changes in the colour of light and still see quite realistically. However, film and video cameras cannot do this. Therefore colour correction filters are used for good colour quality of the production.

FILTER: Among the most common filters are neutral density filters which reduce the intensity of the light reaching the imaging system without altering the colour of the light in any way. A haze filter is useful for eliminating the bluish cast. The ultraviolet (UV) filter eliminates the ultra violet rays. Diffusion filters have a rippled surface or an extremely fine, netlike pattern that scatters (diffuses) the light and creates a softer, less detailed image.

Fog filters break up the light like diffusion filters but scatter that light from the bright picture areas into the shadow areas. Double fog filters produce a fog effect but without reducing sharpness.

Basic lighting instruments: Shooting cannot be done in natural sunlight all the time. So artificial lights are needed. Lighting instruments are classified

by the quality of the light they produce and how the light can be shaped and controlled by the lighting instrument itself. A hard light has a narrow angle of illumination and produce sharp, clearly defined shadows, whereas a soft light scatters the light to create much wider angle of gentle diffused illumination.

Lights are also classified as spotlights or flood lights; spotlights illuminate small concentrated areas while floodlights cast a diffused and even beam of light over a fairly large area.

LIGHTING APPROACH: The basic three-point lighting uses a key light, fill light and back light. The primary source is the key light, It illuminates the subject. Then there is the fill light. It fills in the shadows created by the key light. Backlight is placed above and behind the subject at enough of an angle to keep the light from coming directly into the camera lens. The backlight helps to outline the subject and separate it from the background.

Additional lights sometimes referred to as separation lights amplify or enhance the three-point lighting. They are: *eye light* which is placed near the camera to add sparkle to a persons eyes, a *background light* that illuminates the background.

SOUND IN TV PRODUCTION: Sound is also an essential element and should be given much thought and care. Sound has a number of characteristics that are important to understand in order to select the right audio equipment and record properly.

PITCH AND FREQUENCY: Sound waves travel in well-defined cycles. Frequency is the number of times per second that the wave travels from the beginning of one cycle to the beginning of the next, and is measured in hertz (Hz). The sound made by differing frequencies is the *pitch*. Each microphone and tape recorder has its own *frequency response,* the range of the frequencies that it will pick up. Microphones and recorders may not pickup all frequencies equally well. As a result equipment of varying ability to pickup various frequencies with a graph called a *frequency curve* are used.

LOUDNESS AND AMPLITUDE: Amplitude is related to loudness. As the amplitude increases, the sound will appear to become louder. Loudness is measured in decibels (dB). A whisper is about 20dB, conversation about 55dB, and a rock concert can get well above 100 dB. The *threshold of pain* starts at about 120dB. The range of quietness to loudness is called *dynamic range*. If something is recorded louder the system can handle, the result is distortion.

SIGNAL TO NOISE RATIO (S/N): Most electronic equipment has inherent noise built into it that comes from the various electronic components. One of the specifications provided for equipment is its signal to noise ratio, usually something like 55:1, which means that for every 55 dB of signal recorded 1 dB of noise is present.

TIMBRE: Timbre deals with such characteristics as mellowness, fullness, sharpness and resonance. *Harmonics* and *overtones* contribute to the production of timbre. A sound has one particular pitch, called a *fundamental*, but it has other pitches that are exact multiples of the fundamental frequency (harmonics) and pitches that may or may not be exact multiples (overtones). Timbre can vary for different mics.

DURATION: Duration is the length of time a particular sound lasts. Duration has three parts: attack, sustain and decay. *Attack* is the amount of time it takes a sound to get from silence to full volume; *sustain* is the amount of time the sound is at full volume; *decay* is the amount of time it takes sound to go from full loudness to silence.

VELOCITY: Velocity refers to the speed of sound. This speed is 750 miles per four, which is relatively slow. This can cause *phase* problems. If two microphones pick up the same sound at slightly different times, they can create a signal that is out of phase; one of the mics is receiving the sound when the wave is going up and the other is receiving the sound when the wave is going down. The result is that some or whole of the sound is cancelled, and little or nothing is heard. One way to avoid this problem is the *three to one rule*. No two microphones should be closer together than three times the distance between them and the subject.

MICROPHONES: Microphones are the instruments that collect the sound and convert it in to electrical energy. In addition to differing in frequency

response, dynamic range and timbre producing qualities, microphones have particular characteristics that relate to their directionality, construction, and positioning, etc.

DIRECTIONALITY: Directionality in a microphone involves its *pickup pattern*. A unidirectional mic is appropriate for one or two people speaking and the background noise is undesirable. It is also called *cardioid mic* because of its heart shaped pickup pattern. Other unidirectional mics in use are: *super-cardioid, hyper-cardioid* and *ultra-cardioid* whose patterns are longer and narrower than those of regular cardioid. *Bi-directional mics* are used when two people facing each other directly. The sound is carried from both directions. *Omni-directional* mics are best for picking up a large number of people and are excellent for gathering background noise from all directions.

Stereo recording requires at least two mics or specially designed stereo mics that have several different pickup elements within them. One approach to stereo recording is M-S (mid-side) miking. This uses bi-directional and super-cardioid mics; the bi-directional mic picks sound to the left and the right and the super-cardioid mic picks up sound to the front. The output of both mics is fed through a complicated circuit that makes use of their phase differences to produce left and right channels.

Two cardioid mics are used placing next to each other in another method called *X-Y miking.* One angles 45 degree to the left and the other angles to right at 45 degrees. This way both mics pick up sound from the centre, and primarily one mic or the other picks up sounds for each side. When the recording is played back through stereo speakers, it yields left and right channels.

CONSTRUCTION: Based on construction, mics can be divided in two types. A *dynamic mic* uses a diaphragm magnet and coils of wire wrapped around a magnet. The diaphragm moves in response to the pressure of sound and creates a disturbance in the magnetic field that induces a small electrical current in the coils of wire.

A *condenser mic* has an electronic component called a capacitor that responds to sound. A diaphragm moving in response to sound waves

changes the capacitance at the back plate, which then creates a small electrical change.

POSITIONING OF MIKES: *Boom* is a device with a long pole with the mic on the end of it that positions the mic above the talents and is moved as each person speaks. Sometimes they consist of a simple pole (called a fish pole), which have a *shock-mount* on the end to isolate the mic from vibrations.

Stands like *floor stand* and *table stands* are also used to hold mics. *Hidden* mics are not desirable if people in the scene move a great deal. Cameras also have in built mics which are not appropriate as they are usually too far from the talent to pick up their sound well. Very small microphones called *lavalieres* attach to clothing.

Some microphones be they lavaliere or stand mics do not have cables. They are called *wireless mics. Shotgun mic* has very long but narrow pick up pattern, usually super, hyper, or ultra-cardioid. They are almost always covered with windscreen.

RECORDERS: Sound travels from a microphone through cable and connectors to recording equipment, which stores it on either audio tape a videotape. The videotape recorders and the audiotape recorder have the same function control as most recorders-play, record, stop, pause, fast forward, rewind.

Most recorders have three audio heads erase, record and play. The erase headlines up the iron particles in a straight manners that contain no audio impulses. The record head rearranges the particles to form representation of the sound. The play head picks up the sound recorded by the record head and reproduces it.

High quality tape recorders have a VU (volume unit) meter, a devices that shows how loudly the sound is being recorded. *Equalization* function enables you to cut out or emphasize certain frequencies such as bass or treble. Some recorders have automatic gain control (AGCs) in which the gain is automatically adjusted so that recording is neither too soft nor too loud.

2.2.12 VISUAL TERMINOLOGY:

Several terms describe what the camera sees and the perspective of the scene offered to the viewer. The descriptions of the composition of a shot involves such elements as the distance between the camera and the subject, the amount of the subject shown, and the position or angle of the camera in relation to the subject. But first we should know the following terms:

Shot: A shot begins when the camera starts running and ends when it stops. It may be short or long, require a complex camera movement, or be totally static. A shot begins as the Director says **roll camera and action** and ends with the word **cut**.

Scene: A scene is usually defined as any unified action occurring in a single time and place. It may be composed of a single shot but normally is made up of a group of shots.

Sequence: A sequence is somewhat an arbitrary concept. It consists of a group of scenes linked together or unified by some common theme, time, idea, location or action. A sequence conveys a message.

The basic shots: *Establishing shot (ES) / full shot (FS) / cover shot (CS*): The major area of action is to be seen. This type of shot helps establish or re-establish the setting. Ex. the long shot of a building, play ground, the sea with high tides, dark lane with no traffic.

Long shot (S): The widest possible view of the scene is to be shown. Defining long shot cannot be precise since a long shot may mean different things to different directors, for example LS of a building may include all the building and its surroundings or only a portion of the building. Showing the full height of the talent with surroundings is a long shot.

Medium shot (MS): A smaller portion of the scene is to be shown than in a LS. In effect, a long shot comprises several medium shots. Showing the talent from head to thigh is a medium shot.

Close-up (CU) / tight shot (TS): Generally a close-up isolates the subject such as a talent from the surroundings. A smaller portion of the scene is to be shown than might be in a MS. Several close-ups make up a medium shot. Showing the bust i.e., the head and part of the chest is a close up. But showing only the face is a tight shot.

Some other terms are also used to indicate intermediate designations. Common examples are '*medium long shot'* (MLS), a camera shot showing more than a MS but less than a LS; *medium-close-up* (MCU), an *extremely-close-up shot* (ECU) shows only a small portion of a talent or object like the eyes of a girl or the face of a watch.

A composition is also described according to the number of people in the shot. A "two-shot" indicates that there are two people or items, a "three-shot" includes three people or items, and so on. For example, you can write, "two-shot of Rama and Hanuman".

Some subjective camera terms are also used in scripts.

Point of view (POV): The camera shows the viewer the scene from the subject's viewpoint. For example, write "POV" when you want the viewer to see out of a car window, from the driver's perspective.

Over the shoulder (OS): The camera is placed behind the shoulder of one of the talents to show what or whom that talent sees.

Canted shot: Such a shot shows a scene or talent out of the normal horizontal and vertical orientation. This is done to emphasize distortion, disorientation, and unreality. The canted shot can illustrate the effect of drunkenness, drug use or severe head injury.

High angle / low angle: Here size and dimension can be emphasized. The camera could look down from a high angle on a person to stress his or her diminutive size; you could write "high angle on Gulliver", which would show Gulliver looking up into the camera lens, emphasizing his short stature. The low-angle could be used in a reversed way. Thus "low angle on Shaktiman" would indicated that he would be shown from a low angle, emphasizing his size and height, as a small subject, like a child, would see her.

CAMERA MOVEMENTS:

Some camera movements can be used not only to follow moving people or objects but also to provide different psychological effects.

Follow: The camera follows the character's actions while maintaining approximately the same image size and perspective.

Zoom in / Zoom out: In a zoom the elements of the lens move, magnifying (zoom in) or reducing (zoom out) objects in a way that the

human eye cannot. It can present shots ranging from a CU to a LS and any composition in between.

Dolly in / Dolly out: An effect similar to zoom in/out can be achieved by having the entire camera move toward (dolly in) or away from (dolly out) the talent or the scene.

Pan right / Pan left: The panoramic view of the scene can be shown by having the camera mount remain stationary but pointing the lens of the camera to cover the scene. "Pan right" indicates that the camera is to cover or show the scene beginning at the left and continuing to the right. "Pan left" provides the opposite perspective.

Tilt up / Tilt down: The camera can show or setting a talent going from a low to a high angle (tilt up) and from high angle to low angle(tilt down).

Truck right / Truck left: The term "truck" is used when you want to follow the panoramic action but maintain the same distance between the camera and the action on the talent. In this case the camera is mounted on a trolley that moves on rails.

Pedestal / Boom / Crane-up or down: Here the camera is placed on a crane. The scene can be obtained as in case of tilt, but it provides extra visual perspective for the viewer. The camera shot would be continuous from a normal angle to a unusually high or low angle.

VISUAL TRANSITION:

Moving from one shot to another shot is called *transition.* The following terms are used to describe transitions or the visual adjustments between composed shots.

Fade in / Fade out: At the beginning or end of a scene or an act, or a major division of production. Gradual appearance of the visual on the screen is fade-in and gradual disappearance is fade-out. Both fade-in and fade-out can be quick or slow depending upon the requirement. There is no overlapping of scenes.

Cut: This is an instantaneous change from one shot to another. Since this is the most common visual transition between shots, it is not written in the scripts.

Dissolve: A shot gradually fades out as another gradually fades in. The two images overlap. It can be a "quick dissolve", or a "slow dissolve". The

image obtained by stopping a dissolve midway is known as *super*. A "match dissolve" is made from one shot to another that is closely related in picture size and appearance.

Key: It essentially means placing one image into the background picture of another. A "*chroma key*" is an electronic effect that eliminates a specific colour in a picture and replaces that colour with another visual.

Wipe: A "Wipe" is a visual transition made by gradually replacing portions of one picture with the corresponding portions of a new picture. During a wipe, a new picture moves the current picture of the screen vertically, horizontally, in a circular pattern or from any corner of the picture. Many patterns for wipe are available.

2.3 SUMMARY:

- Radio programmes can be live, pre-recorded or a combination of both. Live production involves the risk of production errors, as there are no "second chances". It has to be right the first which is the only time. However, live production is cheaper than recorded production techniques and sometimes easier and quicker. Recorded productions allow supervision and control over quality. In this method, first recording of programmes is done.
- Studio settings offer personnel control, light control, temperature control, sufficient power supply, and access to supplementary production personnel, equipment accessories and spare parts, and even telephones and change rooms. Production can also be done at a temporary remote location. A unique setting can be achieved by thoughtful selection, planning and full use of a remote outside location.
- The Console is the central control board that processes the sounds and voices during recording, editing, and dubbing. This mixes together the various programme sources to form the broadcast output. This is located in the production control room.
- A microphone converts acoustic energy into electrical energy. Several types of microphones are available with different audio pickup patterns. According to the pickup patterns, microphones can be classified as: Unidirectional, Bi-directional, and Omni-directional.

- Television has the following characteristics: Production costs are higher than in most other media. The profile and size of the audience are relatively unstable. It is a friendly, personal medium. It does not respect territorial limits.
- Television programmes are produced in three basic stages or phases. These are: Pre-production, Production, and Postproduction (also be called as: planning, shooting or recording, and editing).
- The shooting script is the final stage of script writing. The shooting script is usually the director's responsibility. The shots in the shooting script are numbered consecutively. In addition to the scene headings, descriptive material, and dialogue from the master scene script, the shooting script provides specific instructions about camera angles, positions, and movements. The shooting script also contains information about the transitions between shots or scenes.

2.4 KEY WORDS:

Live or Recorded Radio Programmes: Radio programmes can be live, pre-recorded or a combination of both. Live production involves the risk of production errors, as there are no "second chances". It has to be right the first which is the only time. However, live production is cheaper than recorded production techniques and sometimes easier and quicker. Recorded productions allow supervision and control over quality. In this method, first recording of programmes is done. Editing and postproduction are done at a later time.

Studio or Remote (outside on location): Studio settings offer personnel control, light control, temperature control, sufficient power supply, and access to supplementary production personnel, equipment accessories and spare parts, and even telephones and change rooms. Production can also be done at a temporary remote location. A unique setting can be achieved by thoughtful selection, planning and full use of a remote outside location.

Basic Equipment Audio Programme Production: The basic equipment to produce audio programme include: *The studio desk (mixer console or control board or control panel), Microphones, Turntable, Compact Discs and Records, and Audiotapes.*

The Console: This is the central control board that processes the sounds and voices during recording, editing, and dubbing. This mixes together the various programme sources to form the broadcast output. This is located in the production control room.

Microphone: A microphone converts acoustic energy into electrical energy. Several types of microphones are available with different audio pickup patterns.

Unidirectional Microphones: *These are appropriate for one or two people speaking side by side. Background noise is undesirable. These are also called cardioids microphones because of their heart-shaped pick-up pattern.*

Bi-directional Microphones: *These are used when two people directly facing each other.*

Omni-directional Microphones: These are used for picking up a large number of people and are excellent for gathering background noise.

Characteristics of Television: The characteristics of TV include: higher production costs, relatively unstable profile and size of the audience, a friendly, personal medium, no territorial limits, etc.

Stages of Television Production: Essentially the production of television programmes encompasses three basic stages or phases. These are: Pre-production, Production, and Postproduction. These phases may also be called as: planning, shooting or recording, and editing.

On-line and Off-line Editing: On-line editing is analogous to cutting the film negative whereas off-line editing has been akin to film editing that uses work prints. Right after tapes are shot, they are dubbed to work print tapes that are then used to make all the editing decision. The work prints are viewed in order to determine the edit-in point and edit-out point.

Linear and Nonlinear Editing: Originally, all video editing consisted of recording shots one after another from the beginning of the programme to the end in a linear fashion. If someone finished editing an entire production and then decided that the second edit should be two seconds shorter, there was no easy way to fix the problem. This process also suffers from *generation loss* because signal information is lost or contaminated when material is dubbed from one analog tape to another.

Cuts only Linear Editing: A cut only system is the most basic and the simplest editing system, which can butt one video image and its dialogue

against another. It cannot execute *wipes* and dissolves since it cannot show two pictures at a time.

Control Track Editing: This process involves using the video control track. An operator uses the controller to mark the *edit-in* and *the edit-out points* on the tape. Then the controller backs up both machines an equal amount so that they run at same speeds, running frames in sync, counts control pulses to the edit-in points, and then starts the edit.

Time Code Editing: Time code is a digital numerical address that includes the hour, minute, second and also the number for each frame. Time code can be recorded on a *linear audio* track, which is referred to a s *longitudinal time code (LTC)*. The item code can also be placed in the vertical interval, which is referred to as *vertical interval time code* (VITC).

2.5 SELF-ASSESSMENT QUESTIONS (SAQs):

1. Write a detailed note on radio programme production.
2. Discuss the equipment used for radio programme production.
3. What are the various formats of radio programme production? Discuss in detail.
4. Write a detailed note on the various stages of TV programme production.
5. Discuss the process of television programme editing in detail.
6. Write a detailed note on the pre production stage of TV programme production.
7. Write a detailed note on the postproduction stage TV programme production.

2.6 REFERENCES / SUGGESTED READINGS:

- **Keith, Michael C & Krause, Joseph M. (1989) — "The Radio Station" published by Focal Press, Boston, London.**
- **Chatterji, P.C. (1993) — " Indian Broadcasting".**
- **Dilliard (190) — "Television Journalism and Broadcasting".**
- **Bhatt, S.C. (1995) — "Broadcast Journalism".**

SUBJECT: RADIO BROADCASTING	
COURSE CODE: BAMC-118	**LESSON NO.: 3**
EDITING FOR RADIO AND TELEVISION: AN INTRODUCTION	

LESSON STRUCTURE:

In this lesson, we shall discuss the basics of radio and television editing. We shall start with an introduction to editing of radio and television programmes. Then we shall focus on the stages of television programme production, and the different types of video formats. We shall also discuss about the terminology used in television production. The lesson structure shall be as follows:

3.0 OBJECTIVES:

Editing is an essential step in any kind of media production. The aim of this lesson is to familiarize you with the process of editing both for radio and television programmes. After going through this lesson carefully, you should be able:

- *To get familiar with the Process of Electronic Editing*
- *To Know about the Editing Equipment and Software*

3.1 INTRODUCTION:

In all kinds of media production, whether for radio or television or film or even for computer, *editing* is considered to be an integral part. Essentially, it is the process of

assembling and rearranging already recorded audio-video materials in it a continuous and meaningful story.

These days, most radio and television are often recorded in film style with little regard for sequential order of audio sequence or video shots at the recording on production stage.

Editing process enables the producer to physically assemble these audio/video fragments into a coherent message on audio or videotape.

Since the editing process takes place after (post) production (and not during production as it happens in the case of live/studio production), it is also called “Post-Production Editing”.

Post-production editing provides the producer an opportunity to look at and manipulate the prerecorded audio or video materials in a more careful and patient way. Of course, it may sometimes take even more time than actual recording.

3.2 PRESENTATION OF CONTENT:

The content of this lesson shall be presented as follows:

- *To get familiar with the Process of Electronic Editing*
- *To Know about the Editing Equipment and Software*

3.2.1 PROCESS OF AUDIO-VISUAL EDITING:

The basic purpose of editing is to put an audio or video programme together with clarity, continuity and impact, and is an interesting manner. To achieve this end, the following suggestions may be useful:

- Preview your prerecorded audio or video materials carefully and patiently once, twice and even more if you have time.
- Make a proper log sheet an note down all important points and precise details that come to your mind.
- Take some time to ponder over recorded materials and re-clarify your ideas about the overall shape of the programme - its central theme, its objectives, style, music, pace, its organization, its beginning and end etc.
- Take a decision about what is important and relevant to the purpose of your programme and what is not.

- Discard all such portion or footage, however beautiful, as does not contribute to the theme of your programme. Select only most effective and good quality sequences and shots for your final version.
- Look for any missing gaps and re-record or re-shoot some more essential material, if it can fill the gaps and can add to the quality and purpose of your programme.
- Now, have a clear idea about the final shape or overall story of your programme and develop the final edit-script. That is: the precise order and continuity of audio bits, video shots, of sound and music, use of transitions, cut-aways and reaction shots that can achieve a smooth flow and desired effect.
- You are now ready to edit actually. Estimate how much time you need for editing. Try to finish it in one go. While editing, stick to your final editing-script as far as possible. Avoid abrupt cuts, and remember the basic rule of progression of shots: LS, MS, then CU. Make good use of cut-aways and reaction shots for television programme.

These are only some guidelines to enable you to follow a smooth procedure. In fact, there are many more things that you will learn when you get an opportunity to edit an audio or video programme either independently or with the help of a professional audio or video editor.

STAGES OF EDITING:

The editing process takes place in several steps or phases ball for radio and television. These are:

- *Recording or shooting phases.*
- *Review (Listening and Viewing) Phase*
- *Decision - Making Phase*
- *Final or Operational Stage (Post Production)*

RECORDING OR SHOOTING STAGE: In a way, the bulk of audio or video editing is largely predetermined by the way the material is recorded or shot. For example, to allow for convenient edits at the post-production stage, it is advisable to let an audio or video shot to continue silent for just a few seconds.

This will facilitate to bring in a designed transition and proper audio/video continuity while joining it to the next shot or sequence.

It is always wise to get some cut aways on the video-tape and/or to record wild track both for audio and video and video clipping a reaction shot or a cut aways in very useful in providing between two shots and helps you to avoid a jump cut.

Similarly, some additional shots of the location must be recorded such as crowd shots, wide shots of streets, traffic, etc. These will provide excellent editing facility and good transition, if and whenever required. Recording ambient sound on the audio track is also very important to provide continuity and transitions.

REVIEW PHASE: This phase is essentially concerned with the listening and viewing of the prerecorded audio/video materials for their quality and suitability. In this phase the producer is required to listen, view and time the audio or video programme from beginning to end and prepare a detailed 'LOG SHEET', giving a brief description of end shot or portion and marking 'Good' or 'NG' (No Good). The review of intervals automatically leads you to the next phase i.e. the decision making phase.

DECISION-MAKING PHASE: At this stage, the whole programme story lies bare before you of course in disconnected sequences. Now you have a little more time to think and contemplate on the course of your editing in a rather patient way. Often you are forced to look at the log sheet or review the raw materials again and again to make your final editing decisions.

Studying, listening and viewing the raw materials-individual shots and sequence-you begin to decide on the final shot sequence. It is at this stage that you re-clarify your ideas about the programme. Discard all that is not required or does not contribute to your story, look for missing gaps and re-record or re-shoot, if necessary.

Finally prepare an 'EDIT SCRIPT' - indicating the order and continuity of shots, mixing of sound and music, use of transition - cut aways, reaction shots to ensure smooth flow. With a complete edit script; you are now ready for the final editing.

FINAL OPERATIONAL STAGE: The operational phase refers to the process in which the planned edits are actually performed using the edit script as a reference. Editing

audio or video - can be best learnt during the actual process with hands on the materials and the machines. Today, a variety of models and types of editing equipment, including computerized and digital control units are available.

These modern machines can perform the editing job with great speed, accuracy and precision. It is difficult to prescribe standard operation for all types of machines, because actual editing operation slightly varies from machine to machine.

Depending on the particular editing technique followed, some of the steps shown here can be skipped. For example, if edit preview is not required, step 4 and 5 can be skipped. Remember that the initial portion of about 10 seconds of the tape is left blank.

In actual editing phase, it is always important to estimate your editing time in advance. Book for all facilities and machines you need and all tapes, log sheets and edit scripts must kept ready by your side. Ideally, the editing task for a programme must be so planned that it can be accomplished in one go, without interruption.

Editing should not be noticeable. When final editing, the programme must appear to be quite natural preserving its rhythm, continuity, flow and flavour.

VIDEO EDITING PROCEDURE

PLAY (ER) MACHINE	RECORD (ER) MACHINE
* Turn on Power for Player.	* Turn on Power for Recorder.
* Turn Monitor Power On.	* Turn Monitor Power On.
* Insert MASTER TAPE in the player and set counter after FFD/RWD and CUE.	* Insert BLANK TAPE (Edit Tape) in the recorder and CUE.
* Check audio level.	* Check audio level.
* Reset counter before editing.	* Reset counter before editing.

FOR COPYING

* Cue both tapes and PLAY

FOR ASSEBMLE EDIT

* Cue both tapes at the desired IN and OUT points
* Press REVIEW and observe for correctness
* Press EDIT and STOP after required edit is recorded

* Review EDIT and proceed to next EDIT

FOR INSERT EDIT

* Cue both tapes at the desired IN and OUT points and press VIDEO, AUDIO- I or AUDIO- II, etc
* Press EDIT and stop after required edit is recorded
* Review EDIT and proceed to next EDIT

3.2.2 EDITING EQUIPMENT & SOFTWARE:

Cuts-only video editing involves two video tape recorders, one or two monitors, and an edit controller. One videotape recorder, called the source deck, contains the original camera footage that is to be rerecorded. The other recorder, called the edit deck, is the machine on to which selected materials from the source deck are edited. One monitor shows the output of the source deck; the other shows the output of the edit deck. The edit controller is used to mark the editing points and cue the decks to execute the editing decisions.

Advanced editing can be achieved by incorporating other equipment like the switcher, which can generate transitions. The A-B roll uses two sources to supply one edit machine, special effects generator (SEG), and character generator (CG), which can generate graphics.

Computer assisted editing has changed the world of editing. One advantage of using desktop computer for editing is that the same computer can be used for graphic programmes, special effects, audio, shot logging and other production process. This makes postproduction more of a "one stop" process that is less time consuming than postproduction has been in the past.

VIDEO EDITING SOFTWARE:

Video editing software handles the editing of video sequences on a computer. It has the ability to import and export video, cut and paste sections of a video clip, add special effects and transitions.

Lightworks, **Avid** and more recently, **Apple**'s *Final Cut Pro* are pioneers in video editing software and have a great influence on how films and TV programmes are edited. These systems use custom hardware for video processing (video editing).

With the availability of video processing hardware, specialist video editing cards, and computers designed specifically for non-linear video editing, many software packages are now available to work with them. Some other video editing software are **Velocity** and **Adobe**'s *Premier Pro*.

3.3 SUMMARY:

- Editing is the process that enables us to convert the raw audio and video material into finished programmes. It includes assembling and rearranging material-both while it is being recorded or already recorded material - in a continuous and meaningful flow. Good editing needs a lot of advance planning and sometimes takes more time than actual shooting or recording.
- Both for radio and television the editing process takes place in several steps - recording or shooting stage, review stage, decision-making stage, and the final operational stage. These days very sophisticated computerized and digital editing machines are available. These machines make the editing task easy, sleek, and precise. The basic purpose of editing is to put a radio or television programme in a proper shape with clarity and continuity.
- Lightworks, Avid and more recently, Apple's *Final Cut Pro* are pioneers in video editing software and have a great influence on how films and TV programmes are edited. These systems use custom hardware for video processing (video editing). Some other video editing software are Velocity and Adobe's *Premier Pro*.
- The purposes of editing are: to arrange recorded material into a more logical sequence; to remove the uninteresting, repetitive, or technically acceptable portion; for creative effect to produce new juxtaposition of speech, music, sound and even silence.
- Simply speaking, video editing involves two video tape recorders, one or two monitors, and an edit controller. One videotape recorder, called the source deck,

contains the original camera footage that is to be rerecorded. The other recorder, called the edit deck, is the machine on to which selected materials from the source deck are edited. Advanced editing can be achieved by incorporating other equipment like the switcher, which can generate transitions. Computer assisted editing has changed the world of editing. One advantage of using desktop computer for editing is that the same computer can be used for graphic programmes, special effects, audio, shot logging and other production process.

- Video editing software generally also allows for some limited editing of the audio clips that accompany the video or, at least, the ability to sync the audio with the video.
- Lightworks, Avid and Apple's *Final Cut Pro* are pioneers in video editing software. These systems use custom hardware for video processing (video editing). With video processing hardware, specialist video editing cards, and computers designed specifically for non-linear video editing, many editing software packages are now available. Some other video editing software are Velocity and Adobe's *Premier Pro*.

3.4 KEY WORDS:

Editing: Editing is the process that converts recorded audio and video material into finished programmes. It includes assembling and rearranging material-both while it is being recorded or already recorded material - in a continuous and meaningful flow. The basic purpose of editing is to put a radio or television programme in a proper shape with clarity and continuity.

Editing Process: Both for radio and television the editing process takes place in several steps - recording or shooting stage, review stage, decision-making stage, and the final operational stage. These days very sophisticated computerized and digital editing machines are available.

Purposes of Editing: The purposes of editing are: To arrange recorded material into a more logical sequence; To remove the uninteresting, repetitive, or technically acceptable portion; To compress the material in time, and For creative effect to produce new juxtaposition of speech, music, sound and even silence.

Stages of Editing: The editing process takes place in several steps or phases both for radio and television programmes. These are: *Recording or shooting phase,*

Preview (Listening and Viewing) Phase, Decision - Making Phase, and Final or Operational Stage (Post Production Editing)

Recording or Shooting Stage: Majority of audio or video editing related decisions are largely predetermined. These decisions are reflected in the way the material is recorded or shot. For example, to allow for convenient editing at the post-production stage, audio or video shots are recorded for just a few seconds longer than required. This helps in facilitating a desired transition and proper audio/video continuity while joining one shot to the next shot.

Preview Phase: This phase is essentially concerned with the listening and viewing of the prerecorded audio/video materials for their quality and suitability. In this phase the producer prepares a detailed 'log sheet'. A log sheet provides brief description of the shots and these are marked 'Good' or 'NG' (No Good).

Decision-making Phase: Studying, listening and viewing the raw materials including the individual shots and sequences, the editor decides on the final shot sequence. Editors take such decisions in consultation with the director. Finally an *edit script* is prepared. This indicates the order and continuity of shots, mixing of sound and music, use of transition - cut aways, reaction shots to ensure smooth flow. With a complete edit script; you are now ready for the final editing.

Final Operational Stage: The operational phase refers to the process in which the planned edits are actually executed using the edit script as a reference. Today, a variety of models and types of editing equipment, including computerized and digital control units are available. These modern machines can perform the editing task with great speed, accuracy and precision.

Editing Equipment: Cuts-only video editing involves two video tape recorders, one or two monitors, and an edit controller. One videotape recorder, called the source deck, contains the original camera footage that is to be rerecorded. The other recorder, called the edit deck, is the machine on to which selected materials from the source deck are edited. Advanced editing can be achieved by incorporating other equipment like the switcher, which can generate transitions. Computer assisted editing has changed the world of editing.

Video-Editing Software: Video editing software generally also allows for some limited editing of the audio clips that accompany the video or, at least, the ability to sync the audio with the video. **Lightworks**, **Avid** and more recently, **Apple**'s *Final Cut Pro* are pioneers in video editing software and have a great influence on how

films and TV programmes are edited. Some other video editing software are **Velocity** and **Adobe**'s *Premier Pro*.

3.5 SELF-ASSESSMENT QUESTIONS (SAQs):

1. What are the basic equipment for editing? Discuss in detail.
2. What kind of preparation is required for editing? Discuss in detail.
3. What are the stages of editing? Discuss in detail.

3.6 REFERENCES / SUGGESTED READINGS:

- **Keith, Michael C & Krause, Joseph M. (1989) — "The Radio Station" published by Focal Press, Boston, London.**
- **Chatterji, P.C. (1993) — " Indian Broadcasting".**
- **Dilliard (190) — "Television Journalism and Broadcasting".**
- **Bhatt, S.C. (1995) — "Broadcast Journalism".**