**Basics of Radio Programming and Productions**
**BA(JMC) 203**
**UNIT III**

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# Syllabus- Unit 3

- Elements of Radio Programme

- Radio Production Process

- Equipment used in Radio Production: Types of Microphones, Headphones and Talk Backs, Audio Mixers and Transmitters.

- Recording, Broadcasting and Troubleshooting a. Indoor: Studio, Acoustics and Perspective b. Outdoor: Ambience and Noise

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**Elements of Radio Programme**

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## Elements of Radio Programme

A radio show is any type of program broadcast on the radio, or on the Internet in the case of Internet radio. Radio programmes can be spoken word programmes or music programmes. In spite of the type of programme aired on the radio, the elements of the different programmes remain the same such as:

• Voice

• Music

•Script

•Sound effects.

## THE ROLE OF VOICE IN RADIO

•  For our voice to be recorded in a studio, we use a microphone. They amplify or in other words, increase the volume of your voice. When you speak before a microphone, you don't have to shout. You speak normally and it will be made louder if you use a loudspeaker to listen to.
Voice is important in the following ways
•  Voice conveys meaning.
•   It stimulates our visual imagination: it creates visual images in our minds.
•  When we think of radio, the microphone is the most important element using which you present your programme. The main stay in any radio programme is the human voice.

Think of the voice of an announcer or newsreader on radio. You often find them very pleasant and nice to listen to. That is because of the quality of their voice and the proper use of it.
There are two aspects of the use of human voice in radio production.
•  Firstly, there has to be a well written script to be spoken.
•  Secondly, someone has to speak or read it before a microphone in a studio.

## Music & Radio:

- Music is the soul of radio. Film songs and classical music programmes are independent programmes on radio. Music is also used as signature tunes or theme music of various radio programmes. It enhances the programme in the following ways:
- Music adds colour and life to any spoken word programme.
- Music can break monotony.
- Music is used to give the desired effect of happy or unhappy situations, fear or joy.
- Music can suggest scenes and locations. For example, you have to create a bright early morning situation. This can be done by playing a pleasing note on the flute along with the sound of chirping birds.

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- Most music based stations operate a playlist that is updated every week. The playlist determines what will be played and how often it will be played. The selection of music is not done on personal taste but is a professional judgement that takes into account a variety of factors including the stations target audience, how appropriate a track is to certain times of the day, and increasingly how well it has scored in audience research.
- Types of Music: There are three types of Music:
✓ Hindustani classical
✓ Carnatic classical
✓ Western classical

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## SCRIPT & RADIO PROGRAMMES

- A radio script is a writing which gives the detail of how an entire programme should be. A script takes some of the pressure off presenters doing live broadcasts. It provides them with the reassurance that they know what theyare going to say next so that they can concentrate on how they say it. Scripts also ensures that an item is covered fully, in a logical manner and to set time. A radio script for a presenter is largely a safety measure but it needs to contain certain characteristics to make it effective.
- Though it is written, it is spoken
- It is written for the ear not the eye.
- It is heard only once
- The listener normally does not get a second chance to listen.
- It is conversational.

- It should be simply worded without any difficult or unfamiliar words.
- The sentences should be short and simple and not complex.
- There should be only one idea in a sentence and not many ideas.
- Though there are thousands of listeners, what is written should be meant for just one listener.
- The words chosen should denote the exact meaning and not be vague.
- The words should make pictures in the minds of the listeners.
- Abbreviations or short forms should be avoided. If an abbreviation is used, then its full form should be given.
- While referring to more than one person, avoid using 'he' or 'she'. It can confuse the listeners.

## SOUND EFFECTS

- Sound effects in a radio programme give meaning and sense of location. It adds realism to a programme and helps a listener to use imagination. Sound effects describe the circumstances of a dramatic audio situation. They can be used for such things as setting and place, conveying action, solving certain narrative problems and evoking characteristics. Effects should sound as though they were being heard by the character. Dubbing adds extra sound effects or bring disparate sounds together. Sound effects can be used in two ways: Spot effects or effects that are created as we speak .

- Recorded sound effects.

- Categories in Sound Effects:
- a) Ambiences: It provide a sense of place, "where", and perhaps of time "when", events occur.
- b) Discrete Effects: Indicates individual events; "what", "how", and "how much".
- c) Crowds: Sounds of many people in a crowded situation, without specific voices or words being distinguishable.
- d) Dialogue: Dialogue is sound too. The character of the voice indicates a lot about who the character is. Give importance to vocal contrast.
- e) Silence: A dramatic element.

**Radio Production Process**

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## Radio Production Process

- **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 program.

- **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.

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- 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 or thoughts, ideas, and emotions, regardless of the medium. Words have meaning and power. Words need to be selected carefully. Use words that come close to reality. Informal, rather than formal words are preferred.
- *Sentences:* Sentences are the principal units of organized thought. The keys to construct effective sentences are clarity, simplicity, conversational style and conciseness.

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## Productions

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

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- **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.

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- **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.

### Post- Productions

- **Post production:** This stage generally includes editing Sounds recorded during production and dubbing if required, are the principal focus of post production. 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.

**Equipment used in Radio Production: Types of Microphones, Headphones and Talk Backs, Audio Mixers and Transmitters.**

## Condenser microphone

- While dynamic microphones are popular for stage use, due to their rugged construction, condenser microphones have always been the preferred type for studio recording.
- How a condenser microphone works?
- The British call them "capacitor microphones" – and for a reason, too. You may remember from physics class that a capacitor is essentially two metal plates in close proximity. The closer they are, the higher the capacitance.
- A condenser capsule is constructed similarly. It consists of a thin membrane in close proximity to a solid metal plate. The membrane or diaphragm, as it is often called, must be electrically conductive, at least on its surface. The most common material is gold-sputtered mylar, but some (mostly older) models employ an extremely thin metal foil.

- When sound waves hit the diaphragm, it moves back and forth relative to the solid back plate. In other words, the distance between the two capacitor plates changes. As a result, the capacitance changes to the rhythm of the sound waves. Voilà, we have converted sound into an electrical signal.

## Condenser microphone Image
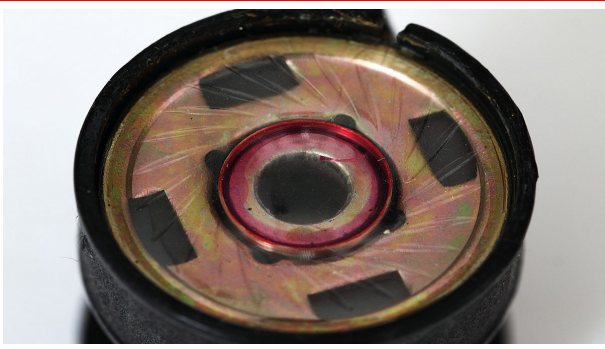
## Dynamic  microphone

- The term "dynamic" can have a lot of meanings, especially when it comes to sound and music. In this case, however, it has little to do with "dynamic range" or a "dynamic performance". In this context, it refers the kind of electromagnetism that happens for instance inside your bicycle's dynamo: When an electrical conductor moves in a magnetic field, an electric current is induced.
- Dynamic microphones, thus, are microphones that convert sound into an electrical signal by means of electromagnetism. They fall into two categories, moving coil and ribbon microphones.

## MOVING COIL MICROPHONES
### (AKA "DYNAMIC MICS")

- Moving coil microphones are probably easiest to understand, because they are basically built like a loudspeaker: A coil is glued to the rear of a membrane, and there is a strong magnet surrounding this coil. When sound waves hit the microphone, the membrane moves to the rhythm of the sound waves, and the coil on its back moves along with it. The relative movement of the coil within its (stationary) magnetic gap induces a small signal voltage in this coil. There's your microphone, a device that converts sound into an electrical signal.
- Moving coil microphones are often preferred for use on stage, because they are quite sturdy and do not require external power. In the studio, engineers usually prefer condenser or in some cases ribbon microphones, which are less robust but offer superior sound reproduction.

- Moving coil microphones are by far the commonest type of dynamic microphones. And since "moving coil microphone" is quite a long term, most sound engineers prefer to call them "dynamic mics" or just "dynamics", thus perceiving ribbon mics as a different category. While this is technically incorrect, it makes a lot of sense from a practical standpoint, because ribbon mics are quite exotic beasts, which sound and behave different than moving coil dynamics.

## Ribbon microphone

- A ribbon mic is actually a type of dynamic microphone. Instead of a dynamic microphone's diaphragm that is attached to a moving coil that vibrates within a magnetic field, ribbon mics feature an extremely thin strip of metal (most often aluminum) suspended in a strong magnetic field. The ribbon acts as both the diaphragm and the transducer element itself, providing the same kind of sensitivity and transient response you'd expect from a condenser but with a wholly different character.

## Ribbon microphone Images

## Microphones – Pickup Pattern

- An Omni-directional polar pattern covers all directions and picks up all sound in a 360 degree radius. These are ideal for natural, ambient recordings and for tie clip microphones - as moving your head to one side will not change the volume. They also make ideal headset microphones, as they sound very natural when close to the mouth.
- Omni directional microphones are pressure sensitive so they are not as affected by wind noise or by the "proximity" effect (the bass boost when you are close to a directional microphone). They are also less susceptible to popping caused by "plosives" (when you say "P" or "B" close to the microphone). Omni directional capsules exist independently of any special housing or cavities to alter the polar pattern.
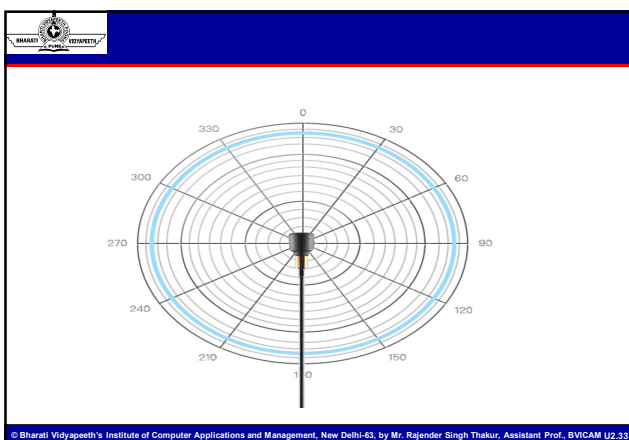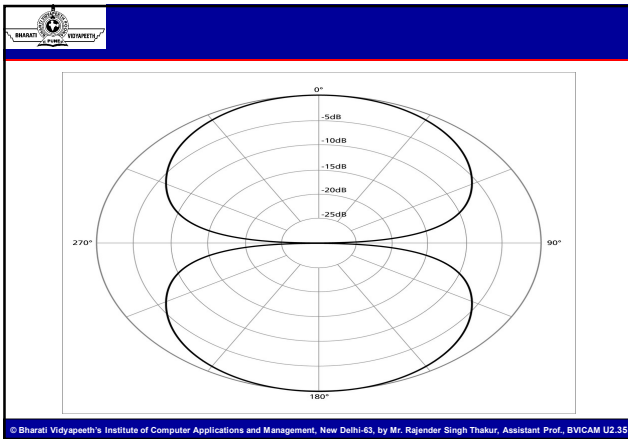
## Bi-directional

- Bi-directional microphones pick up sound from the front and rear while rejecting sound from the sides. You can see on the diagram above that it does not change for different frequencies. This is due to the fact that the capsule exists naturally without any alteration - like omnidirectional microphones which are very neutral sounding.
- Figure of Eight microphones are used for their natural sound quality in some headsets, studio and broadcast microphones. There are also used in "Mid/Side" stereo recording techniques and in stereo microphones like the BP4027 and the BP4029. All ribbon microphones are naturally Figure of Eight.

## Uni-directional

- Unidirectional Microphones are microphones that only pick up sound with high gain from a specific side or direction of the microphone. Thus, if a user is speaking into a unidirectional microphone, he must speak into correct side, normally called the voice side, of the microphone in order to get good gain on the recording. This is in contrast to omnidirectional microphones which pick up sound equally from all directions of the microphone.

## Unidirectional Microphone Polar Response
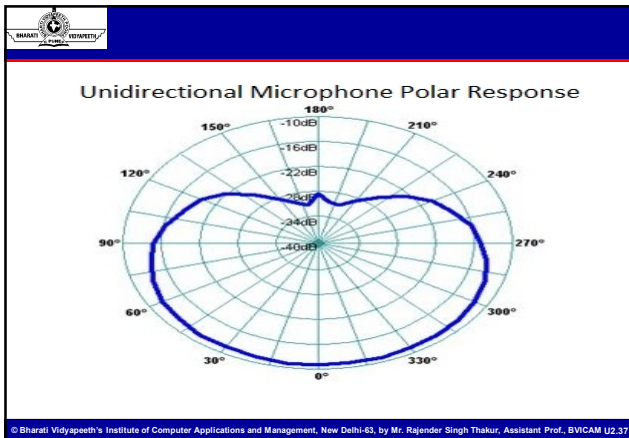
## Headphones

**The Four Main Types of Headphones.**

1) Over-ear

- Let's begin with the shape that jumps into our minds the moment we hear the word "Headphones."
- Over-ear headphones, also referred to as or full-size headphones, are the largest and heaviest type of the bucircumauralnch. They hold the classical shape of two big cups connected with a band that goes around the head.
- The earpieces cover the whole ear tightly so that there is no chance for any sound leakage. Hence, they provide superior sound isolation, allowing you to enjoy whatever you're hearing without external disturbance and sparing your surroundings the noise coming from your headphones.

- Regarding sound quality, they're one of the best as they respond well to even the lowest frequencies. Due to their big-cup design, there's a large room for the sound to reflect, so the soundstage is incredible.

- **On-ear**
- This type takes a smaller size than over-ear headphones while reserving the same around-the-ear shape.
- In terms of portability and comfort, they represent a middle-ground between the former type and in-ear ones, but they're inferior in sound quality. That's because their design allows for the air to pass between the ear and headphones, thus opening a space for some sounds to escape.
- However, that doesn't eliminate your chances of finding a high-quality one with minimum noise leakage.

Although their bass responses aren't as outstanding as that of over-ear headphones, they're preferred by more people, as they're easier to carry around and use outdoors. Thanks to their light weight, they tend to stay in place, so you can use them while running or jumping the rope without worrying about them slipping.

- **In-ear**
- The highlight of this era is that everything is getting smaller, so why stop at headphones? What makes this type stand out is that it combines portability, comfort, and usability, all in a small and compact package. That's why it's the most well-known type in our days.
- Unlike the previously mentioned headphones, these get inside your ears so that the sound is the closest to your eardrums. They're like earplugs but with the option of producing sounds. Consequently, they have second-to-none sound isolation, providing an extraordinary listening experience.
- Although their sound quality is comparable to that of over-ear headphones, they have inferior soundstage due to the limited space in which the sound travels.

- In-ear headphones may not be a suitable choice for studio editors or music producers, but they're definitely an important item in everyone else's pockets.
- They are, hands down, the first choice of fitness people and gym residents, owing to their portable sizes. Bikers also prefer them, as they don't get in the way of their safety helmets.

- Ear buds
- Although this term is used usually to refer to in-ear headphones, there is a difference between the two types.
- Ear buds are less invasive as they stay in the ears' outer shell instead of going inside. When it comes to convenience, they're not on top of the chart because they tend to fall out easily. The fact that they come in only one size doesn't help in this problem as people's ears have different sizes themselves.
- As one of the oldest and most basic headphones, there's nothing worth praising about their sound quality and isolation, yet they come at affordable prices that reserve them a place on the market to this day.

## Audio Mixer

- As the name suggests, an audio mixer is a device that has the primary function to combine and process audio. An audio mixer is a great way to expand a recording studio or even enhance a concert's sound. These mixers are primarily used in four environments: live concerts, music production in record studios, broadcast audio, and television and cinema. This electronic device is used for changing the quality and levels of audio signals. It is a very convenient way to combine various audio signals and even change the dynamics of sound. They enhance audio integration with video to give you a perfectly consistent and coherent A/V experience.
- It is known that the right mixer in the right hands can be powerful and record-breaking. Make sure to educate yourself, practice, and then purchase

- At the most basic level, an audio mixer combines multiple signals and routes them to a common output for recording or amplification through a sound reinforcement system. These signals are the sounds that are captured by microphones or from any other instruments. These mixers, also called mixing consoles, mixing boards, or mixing desks, range from simple tabletop devices to the large giants that you may see in many professional recording studios.
- Some of the most common uses for sound mixers are:
- Combines different instruments into a stereo master mix and additional monitoring mixes used for music studios and during live performances

- Combines a variety of sounds from microphones, tape machines, and other sources for television studios
- Combines multiple microphones into 2 or 4 channels for easier recording during field shoots

## Radio Transmitter

- The transmission of amplitude modulated signal is based on the **radio transmitter** and **receiver**. It is also useful in other types of modulation, including digital modulation. The radio transmitter is an electronic device that produces radio waves and radiates these waves with the help of an antenna. The antenna transmits the radio waves from one end to the other, which is captured by the other antenna present at the receiver end. Thus, data transmission is a communication between the transmitter and the receiver. Let's first discuss the transmitter and its components.

- Transmitter
- The transmitter is the device that sends information. It communicates using wireless or wired media. Examples include **cell phones, Bluetooth, walkie-talkies, computer networks, radio,** and **television broadcasting**. A transmitter can be a component in an electronic device or a separate component in the circuit. The purpose of transmitters is to transmit the information over a certain distance.
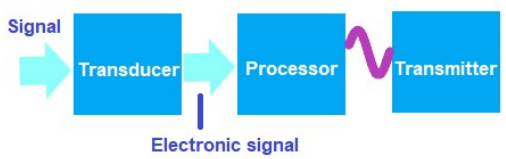
## Components of a transmitter

- We know that a communication channel consists of three main components, the **transmitter**, the **communication channel**, and the **receiver**. The transmitter is not a single component. It also involves a few components before transmitting the signal to the communication channel.
- The components of a transmitter are a **transducer, processor,** and **transmitter**. The circuit of a transmitter are as follows:

**Transducer**
- The transducer converts the signal's energy to electrical energy to make it suitable for transmission. For example,

**Sound energy**
- Sound as the input is converted to the electrical form (electronic signal), which travels through different media, such as optical fiber, cables, etc.

**Processor**
- The function of the processor is to analyze, interpret, and modify the signal for efficient transmission.

**Transmitter**
- The transmitter directly sends the signal to the channel, which is further perceived by the receiver.

- The information travels through the channel and reaches the receiver. The components of the receiver are the same as a transmitter but connected oppositely. The transmitter takes the input from the user, converts it into a suitable form for transmission, and sends it to the receiver through the communication channel. The receiver captures the information, converts it back into the original form, and sends it to the receiver's output.

**Recording, Broadcasting and Troubleshooting**
**a. Indoor: Studio, Acoustics and Perspective**
**b. Outdoor: Ambience and Noise**

## Indoor

- **Acoustics:**
- In our day-to-day life, we normally distinguish between sound and noise In short, we refer to pleasant sequential impressions as sound, while chaotic or obstructive sounds are considered noise.
- There is a fine line between the sound and the noise. For reducing the noise, a sound-absorbing material is helpful. For studying how sound transmission takes place and how to control the noise, we will learn Acoustics. Now, let's understand what acoustics is.
- The word 'Acoustic' is derived from the following Greek word:
- 'Akoustika', which means 'of or for the hearing/ready to hear'
- 'Acoustic', which means 'heard or audible'.

- **Acoustics Physics**
- Acoustics is the arm of science that deals with production, control, transmission, reception, and sound effects. In simple words, acoustics deals with the process of generation, reception, and propagation of sound.
- It is that branch of physics that serves the study of mechanical waves in the states of matter (solid, liquid, and gasses) and also with the following things:
- Sound
- Vibration
- Ultrasound and Infrasound

- **Importance of Acoustics**
- The techniques/methods we use to absorb undesirable sounds by using soft-porous surfaces is called acoustic protection.
- For example, you are working in the steel industry, and machines are producing large noises. To reduce this noise, what you can do is, insert any soft material into the valves of the machine, then the noise from that machine minimizes. It's because the smooth and plain surfaces produce large noise and soft-porous materials avoid the echoing of the sound because of which the sound-level reduces. That's why porous materials are used in noise control industries.

## Outdoor

- Ambience & Noise
- *Ambient sound* (AKA *ambient audio, ambience, atmosphere, atmos* or *background noise*) means the background sounds which are present in a scene or location. Common ambient sounds include wind, water, birds, crowds, office noises, traffic, etc.
- Ambient sound is very important in video and film work. It performs a number of functions including:
- Providing audio continuity between shots.
- Preventing an unnatural silence when no other sound is present.
- Establishing or reinforcing the mood.
- There are several types of ambient sound used in film production. Their exact names and meanings may vary but these are some common definitions:

- **Matching ambient sound** Any ambient sound recorded to match the ambient sound of a scene.
- **Wild sound** Background noise with distinct sounds, i.e. more than ambient sound, which is not synchronised with the main vision. Example: Children playing in a playground.
- **Buzz track** A general term for ambient sound.
- **Room tone** The sound of an empty room, or a room in which all the actors are standing silently.