Facilitator Guide

Wireman
Control panel

Sector
Electronics

Sub-Sector
Industrial Electronics

Occupation
Manufacturing

Reference ID: ELE/Q7302, Version 1.0
NSQF Level: 3
Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.
Acknowledgements

The need for having a standard curriculum for the Job Role based Qualification Packs under the National Skills Qualification Framework was felt necessary for achieving a uniform skill-based training manual in the form of a Facilitator Guide.

I would like to take the opportunity to thank everyone who contributed in developing this Guide for the QP Wireman Control Panel. The Guide is the result of relentless pursuit to develop an effective tool for imparting the Skill Based training in the most effective manner.

I would like to thank the team of KontentEdge for their support to develop the content, the SME and the team at the ESSCI along with the industry partners for the relentless effort in bringing the Guide in the current format.

CEO
Electronics Sector Skills Council of India
Facilitator Guide

About this Guide

This Facilitator Guide is designed to enable training for the "Wi-Fi Reconnect Panel Qualification Pack (QP). Each National Occupant (NOS) is covered across Unit/s.

Key Learning Objectives for the "Wi-Fi Reconnect Panel NOS mark the beginning of the Unit/s for that NOS.

The symbols used in this book are described below.

Symbols Used

- Ask
- Pracical
- Demonstrate
- Team Activity
- Learning Outcomes
- Facilitation Notes
- Do
- Explain
- Say
- Resources
- Activity Summary
- Role Play
- Example
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1. Fundamentals of Wiring

1.1 Objective of the Module

1.2 Icebreaker

1.3 Introduction to a Control Panel

1.4 Components of Control Panel

1.5 Fundamentals of Electricity

1.6 Basics Concepts of Automation and Electromechanical Control System

1.7 Tools and Equipment
Key Learning Outcomes

At the end of this module, you will be able to:

• Define control panel
• Identify the various components of a control panel
• Identify the cables used in a control panel
• Define fundamentals of electricity
• Explain basic concepts of automation and electromechanical control system
• List the tools and equipment used for a control panel
UNIT 1.

Objectives of the Module

At the end of this unit, students will be able to:

• Explain the fundamentals of a control panel
• Identify the components of a control panel such as cables, various circuit elements and so on
• Demonstrate different types of cables used in control panels
• Explain fundamental laws of electricity such as Ohm’s law and Kirchhoff’s Law
• Explain basic concepts of automation and electromechanical control system

Ask

• Ask the participants to define control panel.
• Enquire if anybody has ever seen an electrical/electronic circuit. If yes, then ask them to name some components used in the circuit.
• Ask the participants to tell the difference between electrical and electronic components.
• Ask if anyone knows about automation.
• Ask the participants to share their expectations from this course.

Notes for Facilitator

• Make the session interactive by involving the participants in discussion and introduce the topics to them.
• You could ask the participants about their expectations from the course. Then, inform them briefly about the major topics that will be covered in this course.
• Invite the participants to share their expectations on the whiteboard/blackboard.
• Give the participants a brief overview of what all will be covered in the course.
UNIT 1.2: Icebreaker

Unit Objectives
At the end of this unit, students will be able to:

• Demonstrate the main functions of a computer and the different peripherals devices
• Break the ice between each other

Do

• Make two teams and in the first team, you may have all the participants whose names' first alphabet falls between A to M and the other team having the remaining participants. This strategy may change if you feel one team has more members than the other.
• Ask the teams to stand in a circle. Both teams together will make one circle, standing neither too close nor too far.

Notes for Facilitator
• Ask the participants to call out their names along with any electrical, electronic, mechanical device or any tools which they remember or might have used in the past, at home or work.
• The thumb rule of the game should be the electrical, electronic or mechanical device they will speak has to start with the same alphabet as that of their name. For example, if a participant's name starts from A, say Akash, then he can speak A for Akash and A for Ammeter or P for Pawan and P for Plier. You can give more examples to them.
• It is an active icebreaker which quickly familiarizes the participants with names and brings a feeling of a team, while being fun to recall the names of the tools that they are soon going to use in the course.
Wireman Control Panel

UNIT 1.

Introduction to Control Panel

Unit Objectives

At the end of this unit, students will be able to:

• Define control panel.
• Carry an electricity distribution control panel.

Asks:

• Do you know about internet?
• Have you ever used internet?
• Why do you think internet is useful?
• What was the last task you performed on internet?

Explains:

• Tell the definition of control panel.
• Explain the labelled diagram of a control panel.
• Then explain the elements of a control panel such as supply, connectors for the outputs, cables, circuit breakers, connector switch, mainframe cabinets, and so on.
• Use the given examples of control panel that are VFD control panel and control panel of an elevator control system to explain further.

Notes for Facilitator:

• Tell the participants that a control panel is a cabinet containing electrical and electronic components to control the motors and other equipment.
• Explain a control panel to them with the help of analogy. Tell them that the building in which they have gathered also has some control panels such as an electrical control panel, a fire alarm control panel, a PBX control panel and so on.
• Tell them a control panel is similar to a control room, which acts as a central space where any service can be monitored and controlled. For example, in case of railways, the main control room tells which train is coming on which track and which station is vacant for which train and so on. Similarly, the control panel takes inputs for electricity/power (which can be related to the trains) and the wires that you put together are the train tracks.
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• Inform them that the wiring of these control panels is done by a wireman based on a wiring diagram provided by a design engineer. The wireman's role is similar to that of the engine driver who controls which train goes where, and changes its track on time and as scheduled, ensuring its arrival at the correct station. Your supervisor's role is similar to that of the station master.

• Say...

• Tell the participants that they must have seen many electronic devices such as a radio, television, computer circuit board and many more. They all consist of electrical components such as resistors, capacitors, inductors, transistors, and so on.

• Similarly, control panels comprise of basic electrical components and follow some basic electrical fundamentals to give a customized solution such as electrical heaters and elevator controllers. Therefore, for wiring of such control panels, it is important to learn about these components and the fundamentals of electricity.

• This brings the need of the next units in this module.
UNIT 1.

Objectives

At the end of this unit, students will be able to:

• Describe the components of a control panel
• Identify cables used in a control panel

Carry the following types of cables and circuit elements:

• Diodes and Transistors
• ICs and LED
• Power Sources
• Resistor, Capacitor, Inductor, and Thermistor
• Solenoid
• Transformer
• Coaxial cable, Paired cable, Ribbon cables
• Portable cord

Components are basic building blocks of a control panel.

It involves simple to complex circuitry based on the number of components used. For example, the complexity of a fire alarm control panel is less than the complexity of a main frame's control panel.

The main components of a control panel are circuit elements such as resistor, diode, power supply and so on and cables such as coaxial cable, paired cable, portable cord and so on.

Demonstrate

• Show different types of cables.
• Show the different components of the control panel and classify them as a active, passive and electromechanical.

After showing them the control panel, ask them to:

• Tell about the components of a control panel.
• Identify the types of cables used in the panel. Notice the colour of the cables.
• Notice the neatness with which the cables have been connected.
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Notes for Facilitation

- Define cable as an assembly of electrical conductors/wires insulated from each other but laid up together (by being twisted around a central core).

- In addition, tell them that a cable is often misunderstood with a wire. Explain to them the difference between a wire and a cable with the help of the following table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Wire</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Is a thin, flexible thread of metal</td>
<td>Is an assembly of electrical conductors/wires</td>
</tr>
<tr>
<td>Uses</td>
<td>Used to bear mechanical loads or electricity and telecommunication signals</td>
<td>Used for: Power transmission, To connect two or more devices, To carry electric currents</td>
</tr>
<tr>
<td>Types</td>
<td>Solid wire and stranded wire</td>
<td>Twisted pair cable, coaxial cable, multiconductor cable, fibre optic cable and so on.</td>
</tr>
</tbody>
</table>

- Then explain to them the applications of cables such as:
  - To carry electric current or electric signals from one device to another.
  - To connect circuits within and between electronic devices.
  - In high voltage power cables (HVPC) for bulk power transmission of alternating current (AC) and direct current (DC).
  - For ESD sensitive circuits or to provide protection in high-power/voltage applications.
  - In wiring of the building for lighting and power and control circuits such as generators, elevators control panels, temperature control panels and so on.

- Further explain to them the correct way of cable management by the use of products such as cable trays, cable ladders, and cable baskets to support a cable through cabling routes.

- Brief them about the usage of each product such as cable trays which are used as an alternative to open wiring or electrical conduit systems, cable ladders provide continuous support for the cables along their entire lengths and cables are used for data and fibre optic cables. They are also used when there are multiple connection requirements and so on.

- In addition, tell them that:
  - Coaxial cables are also known as helix cables.
  - Communication cables are copper conductors. A copper wire is used in telecommunications, electronics circuitry, power generation, power transmission, power distribution, and so on. Coaxial cable, multiconductor cables and twisted pair are used as communication cables.
Flexible cables, also known as continuous flex cables, are specifically designed to cope with the bending of cables and physical stress on the cable inside cable carriers. It is used in automation.

In a shielded cable, there is one or more insulated conductors that are enclosed by a common conductive layer. The shield may contain braided strands of copper or aluminium, a non-braided copper tape that is wound spirally, or it may contain a layer of conducting polymers.

Twisted pair cable may be shielded or unshielded.

Then explain to them about active components using the following points:

Those components which generate energy in the form of voltage or current are called active components. If we take a simple real example of an active component then it would be sun, which has its own light and energy.

In very simple words, we can say that active components are energy donors.

Brief them about each component along with its application with the help of the following table:

<table>
<thead>
<tr>
<th>Components</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Circuit (IC)</td>
<td>Oscillator, Amplifier, Timer, Counter, a microprocessor or computer memory</td>
</tr>
<tr>
<td>Transistors</td>
<td>Amplifier, Switch</td>
</tr>
<tr>
<td>Power Sources</td>
<td>Provides energy (power) to the circuit</td>
</tr>
<tr>
<td>Light Emitting Diode (LED)</td>
<td>Signal, Width, Headlamp, General lighting, Traffic signals, Camera flashes, Lighted wallpaper</td>
</tr>
<tr>
<td>Solenoid</td>
<td>Automatic: interlock device, Industrial: locking, clamping, punching, positioning, diviing, holding or rotating</td>
</tr>
</tbody>
</table>

Fig 1.4: Active components and its applications
Next, explain to the participants about passive components using the following points:

- Passive components are those components which do not require any power source to perform their specific functions.
- These components are not capable of controlling current.
- Brief them about each component along with its application with the help of the following table:

<table>
<thead>
<tr>
<th>Components</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer</td>
<td>To increase (or step-up) voltage, decrease (or step-down) supply voltage, protect from over-voltage, protect logic gates.</td>
</tr>
<tr>
<td>Radio demodulator</td>
<td>Power conversion, over-voltage protection.</td>
</tr>
<tr>
<td>Resistor</td>
<td>In a low-noise amplifier or a pre-amplifier, in heavy-duty industrial circuits.</td>
</tr>
<tr>
<td>Capacitor</td>
<td>Energy storage, digital memory, pulsed power and weapons, power conditioning.</td>
</tr>
<tr>
<td>Inductors</td>
<td>Energy storage, analog circuits and signal processing.</td>
</tr>
</tbody>
</table>

Tell the participants that thermistors are widely used as:

- Inrush current limiters.
- Temperature sensors that is Negative Temperature Coefficient or NTC type, self-regulating heating elements.
- Positive Temperature Coefficient or PTC type self-resetting overcurrent protectors.

- To protect against inrush overvoltage with NTC, resistance will decrease as the temperature will rise. To protect against overcurrent with PTC, resistance will increase as temperature rises.

Finally, explain them the electromechanical components.

- After explaining all these components, you can show them a PCB on which multiple resistors, capacitors, thermistors, diode, motors, generators, transformer and so on have been mounted. Then ask them to identify the total number of each component present on the PCB.

Activity handling strategy for Identification Game:

- Label the components from A to I. Place the components with their labels neatly on a table and ask the participants to come with their handbooks, one by one, to look at the components and their labels.
Ask the participants to match the labels with the names of the components. When all the participants have done the task, then tell the names of the components one by one and ask the participants to check whether they have matched the names correctly or not.
UNIT 1.5: Fundamentals of Electricity

Unit Objectives

At the end of this unit, students will be able to:

- Define fundamentals of electricity

The main scope of this unit is to make participants aware about the fundamentals of electricity. They need to be aware because any wrong connection in a circuit may cause damage or pose a threat.

Ask

- Ask the participants if they know what current and voltage are.
- Then, ask if they know some laws related to current and voltage.
- Ask them if they know the difference between AC and DC current.

Explain

- Explain to the participants that in earlier times, most electrical devices used resistors and resistance. Georg Simon Ohm conceptualized the meaning of resistance and came to the conclusion that voltage and current were mathematically related for wires.
- Tell them that since its conception, Ohm's Law has been generalized multiple times by different people for different devices.

Notes for Facilitator

- Explain to the participants, the Ohm's Law. Then tell them about the linear relation of current and voltage with the help of the following graph, where X axis represents current and Y axis represents voltage.

![Graph](image-url)
In addition, tell them the formula $V = IR$, where $V$ is the voltage across the device, $I$ is the current flowing through the device, $R$ is a constant and known as resistance which depends upon the material from which the device is constructed.

Now that they have learned the relationship between current and voltage, ask them to solve a simple numerical based on Ohm’s law:

If 0.5A current is flowing through a 5 ohm resistor. Calculate the voltage of two points of resistor.

Solution:

$V = IR$

$V = 0.5 \times 5 = 2.5V$

Then explain to them Kirchhoff’s Law.

Further explain to them electrical polarity. Tell them that electrical polarity (positive and negative) is used to describe the direction of current flow in a circuit.

Inform them that in the diagram in the handbook also current has been shown flowing from the positive terminal to the negative terminal.

Tell them the difference between AC and DC with the help of the following table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Alternating Current</th>
<th>Direct Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction</td>
<td>Reverses periodically</td>
<td>Single direction</td>
</tr>
<tr>
<td>Current</td>
<td>Varies with time</td>
<td>Constant magnitude</td>
</tr>
<tr>
<td>Obtained from</td>
<td>A.C. Generator and mains</td>
<td>Cell or Battery</td>
</tr>
</tbody>
</table>

Types

1. Sinusoidal, Trapezoidal, Triangular, Square

2. Pure and pulsating

A 0.5A current flows in circuit $\Phi_1$, due to Ohm’s law $V = IR$, resistance of the circuit is 2 ohms.

Fig 1. 5.2: Difference between alternating and direct current

In addition, tell the participants that in a direct current circuit, current flows in a single direction and one pole is always negative and the other pole is always positive. In an alternating current circuit, the two poles alternate between negative and positive and the direction of the current (electron flow) reverses periodically.

Further explain to them about series and parallel circuits.

Inform them that in a parallel circuit all the components have the same voltage across them, for example household wiring, so that if any point of the circuit gets damaged, only that part needs to be replaced.
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UNIT 1. 6: Basic Concepts of Automation and Electromechanical Control System

Unit Objectives
At the end of this unit, students will be able to:

• Explain basic concepts of automation
• Define electromechanical control system

Ask the participants if they know anything about automation. If yes, then ask them to give some examples. Ask them if the use of machines ease their daily task.

Notes for Facilitator
• Define automation as, automation means use of various control systems, such as computers technologies for handling different processes and machineries in an industry to ease the work of human. Tell them the best example of automation is IC’s, where with the help of automated technologies it is possible to pack over 100 million transistors on a single chip.
• Then tell them a few advantages of automation:
  - High productivity
  - Improved product quality
  - High flexibility and accuracy

• Further explain to them the different types of automation along with their advantages and disadvantages:

<table>
<thead>
<tr>
<th>Type of Automation</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Automation (also known as Hard Automation)</td>
<td>• Low unit cost • Automated material handling • High production rate.</td>
<td>• High initial cost • Relatively inflexible in accommodating product changes.</td>
</tr>
<tr>
<td>Programmable Automation (also known as Soft Automation)</td>
<td>• Highly flexible to deal with design variations • Suitable for batch production</td>
<td>• High investment in general purpose equipment • Lower production rate than fixed automation</td>
</tr>
</tbody>
</table>

\[1, 2, 3, 4, 5\]
Flexible automation

- Continuous production of variable mixtures of products
- Flexible to deal with product design variation
- Medium production rate
- High initial investment
- High unit cost relative to fixed automation.

Fig 1.6.1: Advantages and disadvantages of automation

Next, tell them about basic elements of an automated system are power, program and control systems. In addition, explain to them about open loop and closed loop control system along with the differences between them with the help of the following table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Open loop control system</th>
<th>Closed loop control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Error Detector</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Stability</td>
<td>Stable</td>
<td>Unstable</td>
</tr>
<tr>
<td>Complexity</td>
<td>Easy to construct</td>
<td>Complicated construction</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Inaccurate</td>
<td>Accurate</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Requires less maintenance</td>
<td>Requires more maintenance</td>
</tr>
</tbody>
</table>

Examples
- Automatic washing machine, hand drier, light switch and so on
- Automatic electric iron, servo voltage stabilizer, cooling system in car and so on

Fig 1.6.2: Difference between open loop and closed loop control system

Ask them to give some examples of electrical and mechanical systems. Then ask them what they understand by the term electromechanical. If you get valid answers, ask them to tell some examples of electromechanical systems.
1. Tell the participants that electromechanical systems are a new and rapidly growing field which is an integration of electronics, mechanics, pneumatics, hydraulics, and computer control systems to create new and improved automated manufacturing systems.

2. Then explain to them electromechanical control systems.

3. Further, briefly explain to them various components of an electromechanical control system.
UNIT 1.

Tools and Equipment

At the end of this unit, students will be able to:

• List the tools and equipment used for a control panel

Ask

• Ask the participants to name some tools they remember.

• Name the equipment that are used to calculate current, voltage and resistance across the conductors.

Notes for Facilitator

• Show the participants different types of tools and equipment.

• Explain them the usage of each tool and equipment.

• Further inform them that troubleshooting is the process of locating faults or trouble in a circuit. In addition, explain to them how the instruments can be used for troubleshooting with the help of the following points:

  o Ammeter: It is connected in parallel with various switched resistors and this extends the range of currents that can be measured.

  o Voltmeter: Its terminals must be in parallel with the voltage being measured. Voltmeters have a large resistance, so that they only have a small effect on the voltage.

  o Multimeter: It measures all the three quantities like voltage, current and resistance and also includes other features such as a diode tester, which can be used to measure continuity in circuits.

  o Wattmeter: It has two voltage coils (pressure coils) and a current coil. The two pressure coils, in series or parallel to each other, change the range of the wattmeter.

  o Megger: It measures electrical leakage in wire. It is used for verifying the electrical insulation level of any device such as motor, cable, generator winding and so on.

• Activity handling strategy for the Identification Game:

  o Randomly select any participant to answer the questions.

  o Ask each question from 4-5 participants and reveal the correct answer at the end.

  o Correct answer of the first question is Wattmeter.

  o Correct answer of the second question is Spanner.
2. **Basics of Wiring**

**Unit 2**

1. **Objectives of the Module**

2. **Wiring Diagram**

3. **Wire Specifications**

4. **Wire Preparations**

5. **Wire Connections**

6. **Earthing**

7. **Wiring of Basic Circuit**
Key Learning Outcomes

At the end of this module, you will be able to:

• Use wiring diagrams
• Identify wire specifications
• Prepare wires
• Connect wires
• Explain earthing principles and methods
• Identify basic wiring of the circuit components
UNIT 2. Objectives of the Module

At the end of this unit, students will be able to:

• Demonstrate the wiring diagram for wiring the control panel
• Demonstrate wire preparations, such as removing the insulation and identifying different wire coding, marking, and crimping methods
• Explain the connections between wires
• Identify different circuit elements and components and their basic wiring

Ask

• Ask the participants to define wire diagrams.
• Enquire from them if they have seen different types of wiring diagrams.
• Ask them if they know the difference between wire diagrams and block diagrams.
• Ask them to recall the symbols of various components they have studied in the previous module.
• Ask them if they know that each component has its own unique identifier. If you get the answer as yes, then ask them to give some examples.
• Ask them if they can tell about different types of wire.
• Ask them to explain crimping.
• Enquire from them if they know anything about different types of joints.
• Ask them to define earthing and explain different methods of earthing.
• Ask them to name some components of a control panel such as resistor, capacitor, motor, and diode and then ask them to categorize them under active, passive, and electromechanical.

Notes for Facilitator

• Initiate the session with the participants starting with the discussion about the objectives of the module.
• Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
• Introduce the topics to be covered and give some information about them.
• Give the participants a general idea about what will be covered in the module.
UNIT 2.

UNIT OBJECTIVES

At the end of this unit, students will be able to:

- Define electrical/electronic diagrams
- Explain different symbols used in wiring diagrams
- Describe how to read the wiring diagrams

ASSESSMENT

Ask

- Start the session by asking the participants if they know what an electrical/electronic diagram is.
- Then ask them to tell the importance of these diagrams.
- Enquire from them if they know that there are different types of electrical/electronic drawings.
- Ask them to draw a block diagram of any electronic circuit they know about on the black/white board.

Say

- Tell the participants that there is a requirement of a diagram which is typically a kind of a technical drawing that gives information related to the interior or exterior connections between various components of a panel.
- Tell the participants that various components are used in a wiring diagram.
- Tell them that it is important to identify each component correctly to make the appropriate wiring connection.
- Also, inform them that it is necessary to know the polarity of each component correctly.
- Ask the participants to name a few components such as resistor, capacitor, inductor, switches and so on. Ask them to tell their identifiers.
- Enquire from them if they know about nets and labels.
- Ask if they know the term polarity. If they say yes, ask them to define it.

NOMES FOR FACILITATOR

- Tell the participants what electrical/electronic drawings are.
- Explain to them that these diagrams are of three types: block diagram, circuit diagram, and wiring diagram.
Briefly explain to them about each type of diagram with the help of the diagrams given in the participation handbook.

Tell them that block diagrams are used for higher level, less detailed descriptions that are intended to clarify overall concepts without concern for the details of implementation.

Inform them that unlike a block diagram, a circuit diagram shows the actual electrical connections.

In addition, tell them that wiring diagrams are often used to troubleshoot problems and to make sure that all the connections have been made.

Also, tell them that wiring diagrams are different from a schematic diagram and a pictorial diagram.

In a schematic diagram, the actual physical location of the parts of the finished device need not conform with the arrangement of the parts' interconnections in the diagram.

A pictorial diagram, unlike the wiring diagram which uses symbolic notation, has more detailing of the physical appearance of the components and their interconnections.

In addition, draw the following images on the black/white board of the same circuit, which shows its schematic and pictorial diagram.

![Schematic Diagram](image1)

![Pictorial Diagram](image2)
Further explain to them different symbols used in wiring diagram with the help of the following table:

<table>
<thead>
<tr>
<th>Component</th>
<th>Symbol</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistor</td>
<td>A zigzag line with its two terminals prominently projecting out</td>
<td>Heaters, fuses, sensors, lights</td>
</tr>
<tr>
<td>Capacitors</td>
<td>Two plates with two terminals going perpendicular into them</td>
<td>Energy storage, digital memory, power conditioning</td>
</tr>
<tr>
<td>Inductors</td>
<td>A series of looped coils</td>
<td>Filters, sensors, transformers, motors, energy storage</td>
</tr>
<tr>
<td>Switches</td>
<td>Two terminals with a connection line</td>
<td>Electrical contact, on-off operations</td>
</tr>
<tr>
<td>Power source</td>
<td>DC or AC Voltage Sources</td>
<td>Batteries</td>
</tr>
<tr>
<td>Diode</td>
<td>A triangle pushed against a line</td>
<td>Radio demodulation, power conversion, over-voltage protection, logic gates, ionizing radiation detectors, temperature measurements, waveform clipper and clamper</td>
</tr>
<tr>
<td>Transistor</td>
<td>BJTs have three terminals, collector (C), emitter (E) and a base (B)</td>
<td>Can be operated as a switch and as an amplifier, it can be used to make IC's</td>
</tr>
<tr>
<td>MOSFETs</td>
<td>Three terminals, source (S), drain (D) and gate (G)</td>
<td></td>
</tr>
<tr>
<td>Integrated Circuits</td>
<td>A rectangle, with pins connected to the sides</td>
<td>Cars (automotive controls), televisions, computers, microwaves, portable devices such as laptops, MP3 players, cameras, cellular phones to ships, equipment, aeronautics, space crafts.</td>
</tr>
</tbody>
</table>

Fig 2.2: Symbol and applications of components

Further explain to them how to read wiring diagrams. Tell them that there is an identifier of the symbols which make them easy to use and recall again and again. The identifier is generally the first alphabet of the component such as identifier of Resistor is R, Capacitor is C. In addition, tell them that there are some exceptional cases like Crystals and oscillators, the identifier for them is Y.

Further tell them that some of the components on a circuit board have one positive end and one negative end which defines its polarity.
Lastly, explain to them some examples of reading electrical/electronic diagrams.
UNIT 2: Wiring Specifications

Unit Objectives
At the end of this unit, students will be able to:

• List the types of wires
• Explain sizing of wires
• Identify the colour coding of wires
• Tell the participants that an electronic equipment uses various types of electronic cables such as a single wire covered with insulation.
• Tell them that wire specifications include types of wires used, wire size, colour coding and wire markings.
• Tell them that proper selection of the type of the cable to be used is essential to save during the electronics construction phase of a project and to get optimum performance.
• Also, tell them that some of the important types of wires and cables are as follows:
  - RF coaxial feeder
  - Screened cable
  - Ribbon cable
  - Data cable
  - Connecting wire

Notes for Facilitator
• Tell the participants that a connecting wire could be a single wire with insulation, used for point to point connections, or many types of connecting wires could be used for different connections.
• Inform them that connecting wires allow an electrical current to travel from one point in a circuit to another. In a basic electronic circuit, the connecting wire comes from one of the terminals of a power source such as a battery.
• In addition, tell them that connecting wires would only perform their desired functionality when the circuit is complete or closed.
• Explain to them that radio frequency (RF) cables as RF coaxial cable is made up of concentric circular layers.
• Then explain to them the various advantages of RF cables such as RF coaxial cable efficiently carries radio frequency signals from one place to another with a minimum amount of loss and they are convenient, user-friendly and immune to the changes in the environment.
• Tell them that the most common type of antenna feeder used today is a coaxial feeder because it offers the advantage of convenience of use along with being able to provide a good level of performance.
Then explain to them the internal structure of the coaxial cable by the help of the following diagram:

Fig 2.3.1: Internal structure of coaxial cable

Further tell them that screened cables consist of one or more wires enclosed in a jacket, which acts as a screen to safeguard it from stray radiation. Inform them that screened cables reduces electrical noise and electromagnetic interface effects. The shield of screened cables is free from any disturbances as it is covered by braided standard of copper or layer of conducting polymer and this shield is also covered by a jacket. This shield acts as a hurdle which is used to reduce electrical noise which affects the signals and to reduce electromagnetic radiation.

Explain to them that data cables are used to transfer data from one point to another keeping minimum data errors at the receiving end. Inform them that a data cable allows only baseband binary transmissions (0 or 1) from a transmitter to a receiver. In addition, explain to them various types of data cables such as Ethernet cables, serial cable, USB (Universal Serial Bus) cable and so on, and explain these using the following points:

- **Ethernet cable**: An Ethernet cable is one of the most popular forms of network cable used in wired networks, such as in offices to join computers in a network.
- **Serial cable**: A serial cable is a cable used to transfer information between two devices using a serial communication protocol.
- **USB (Universal Serial Bus) cable**: USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and so on.

Ask them to list the factors that they must keep in mind while selecting a wire. Enquire from them if they know how to find out the required size of the wire that can handle the load of a circuit.
Facilitator Guide

- Ask them if they know what American Wire Gauge (AWG) is. If you get a valid answer, then ask them to define AWG.
- Ask them to name the factors to be considered to determine the wire size.
- Enquire from them if they know about the different colour codes of wire.
- Further ask them if they have noticed the marking done on the wire.

Notes for Facilitator

- Inform the participants before making any wired connections that it is important to know the type, colour and size of the wire to be used for making the connection so that it can handle the load of the circuit.
- Tell them that to determine the correct size of wire, the AWG system is used. In addition, tell them AWG is a standard set of non-ferrous wire conductor sizes.
- Also, tell them that each panel has its own unique wire size and ampacity-carrying capability. Based on the requirement of the control panel, correct wires should be used.
- Further explain to them the factors that determine the size of the wire such as:

  - Voltage Source
  - Number of phases
  - Current Drawn
  - Voltage Drop

- Tell them the formula, which is based on Ohm's law, for calculating the wire size. In addition, you can give a simple numerical based on this formula.
- Then explain to them the table that describes the AWG standards of wire size.
- Further explain to them the importance of colour coding of wires by saying that it represents the purpose for which the wire will be used.
- In addition, explain to them the table that represents the colour code and the colour of the wire.

---

Voltage Source

- A voltage source should be such that it maintains a fixed voltage drop across the terminals of the wires.

Number of phases

- Wire can be single phase, two phase, three phase or four phase depending on the requirement of the circuit.

Current Drawn

- The number of amperes drawn by the wire can be obtained from the manufacturer of the wire.

Voltage Drop

- Voltage drop depicts how energy is supplied by a voltage source that is reduced as electric current moves through the passive elements of an electrical circuit.
- Voltage drop of wire can be calculated by the following formula: \( V_{\text{drop}} (V) = I_{\text{wire}} (A) \times R_{\text{wire}} (\Omega) \).
Inform them that in electronic equipment wire markings are generally color-coded to indicate the negative and positive polarity. It is essential to connect the positive and negative wires to the positive and negative terminals respectively. If the wires are crossed in stereo components, such as loudspeakers, it could result in a short circuit due to reversal of audio signals.

Activity handling strategy:
- Activity: Identification Game
  - Draw/show the given circuit diagram.
  - Randomly choose any participant to identify and label one or two components of the circuit.
  - Reveal the correct answer at the end of the game.

- Activity: Matching
  - Match the following.
  - Draw the given table on the white/blackboard.
  - Ask any participant randomly to match the symbol with its name.
Unit Objectives

At the end of this unit, students will be able to:

• List wire preparation methods
• Identify different tools for insulation removal

Ask

• Ask the participants if they know what wire insulation is.
• Ask them to list the tools used in the removal of wire insulation.
• Enquire from them if they know the steps involved in stripping a wire.
• Ask them to name the tool they use for curving a wire.

Notes for Facilitator

• Inform the participants that it is necessary to prepare the wire properly as proper preparation of wires ensures quality and dependability.
• Tell them that wire preparation is done through curving, stripping, sorting, marking and crimping and it is based on the electrical connection, length accuracy, cross-sectional width and amperage.
• Further explain to them each step involved in wire preparation such as:
  - Insulation Removal

Fig 2.4.1: Insulation removal

Insulation removal is one of the basic parts of wire preparation. There are several techniques that are used to remove the insulation of wires. Some best practices to be followed while stripping the wire such as size of the wire should match the correct notch of the stripper. Stripping is impossible if the notch of the stripper is too large.

Explain to them hand-operated strippers and its types, adjustable and non-adjustable.

Then tell them about the steps involved in stripping.

Lastly explain to them the damages that may be caused at the time of removing the insulation of wires.
Tell the participants that it is sometimes required to cut the wire to get the required length.

Tell them that wires are marked with different colors to indicate their purposes.

Inform them that wires must be labeled to provide indications of the use of the wire.

Define crimping.

Explain the various steps involved in crimping.
Facilitator Guide

UNIT 2:

We Connecons

Unit Objectives

At the end of this unit, students will be able to:

• Identify different kinds of wire joints, wiring systems and methods of wiring
• Explain the method of soldering
• Identify the method of joining two wires

Say

• Tell the participants that the components of a control panel are connected through wire connexions. The flow of current is dependent on the type of connexion.
• To establish a connexion, different types of joints are used. Soldering technique is used to make the joint firmer.
• Inform them that soldering is also used in plumbing and metalwork from flashing to jewellery. In addition, tell them electronic soldering connects electrical wiring and electronic components to printed circuit boards (PCBs).
• The joints provide the wires with electrical insulation because joints are made using connectors, heat shrink tubes or electric tape which acts as an insulator to electricity.

Notes for Facilitator

• Inform the participants that to connect cables of different voltages such as low, medium or high, they have to use cable joints.
• Tell them that the joints provide the wire strength and mechanical protection. Also, tell them about the various ways of making an electrical connexion such as crimping, using mechanical connectors and soldering.
• Further explain to them the chart that depicts different types of joints and their applications.

Ask

• Ask the participants if they have seen a soldering iron.
• Ask them if they know what solder and flux is.

Notes for Facilitator

• Inform the participants that soldering is a process of joining two or more objects, which are usually metals, by melting and pouring a filler metal called solder, into the joint.
• Inform them that soldering iron is used to heat up the joint to such an extent that the solder is melted, and then the melted solder flows around the joint making it secured and...
• Define solder to them as a metal alloy that is used to form a permanent bond between the metal pieces, which are to be joined using soldering.

• Further tell them that the function of flux is to facilitate the process of soldering. Also, tell them in soldering, flux is used to prevent oxidation of the materials used in it. It helps the oxides to dissolve on the metal surface, which as a result prevents oxidation by pung a coat on the hot surface.

• Explain to them the various steps involved in soldering along with some ps such as when the soldering iron gets hot and becomes dirty because of oxidation, clean the p with a wet sponge until the p shines and while soldering, they should not touch the iron p.

• Inform the participants that cleat wiring system is not used nowadays as it is suitable for domestic purposes (since it is a temporary wiring). This was specially used only temporary army campus or festival related stalls (pandals).

• Tell them that cleat wiring system comprises of ordinary PVC insulated wires or weatherproof sheathed cable that are braided and held on the ceilings with the help of porcelain cleats.

• Further inform them that casing and capping wiring systems are not in use these days.

• These systems used PVC or other approved insulated cables.

• Explain to them basic wiring system. Tell them that lead or metal sheathed wiring system includes those conductors which are insulated and covered with outer sheath made of lead/aluminium alloy.

• Further inform them that the metal sheath ensures protection to the cables from moisture, atmospheric corrosion and mechanical damage.

• Explain to them conduit wiring system and its types.

• Further tell them that a cable tray system provides support to the insulated cables, which are used in power distribution and communication.

• In addition, also tell them cable trays are alternative to the conduit systems. They are used where frequent changes to the existing wiring system are required, as new cables are installed by laying them in a tray and not by pulling through a pipe.

• For more information on cable tray wiring system, visit the following link: http://www.cooperindustries.com/content/dam/public/bline/Resources/Library/catalogs/cable_tray_systems/all_products/CTManual.pdf

• Ask them do they know the electrical wiring methods. If you get relevant answers ask them to give some information, as much as they know, about:
  o Joint Box or Tee or Joining System
  o Loop-in or Looping System
Facilitator Guide

Notes for Facilitation

- Inform the participants that electrical wiring can be done by using two methods, Joint Box or Tee or Joining System and Looping System.
- Further explain to them both the methods.
- In addition, tell them some advantages and disadvantages of the systems with the help of the following points:
  - Joint Box or Tee or Joining System: It doesn’t require too much cable. It is, therefore, cheaper but it is only a temporary installation.
  - Looping System: This system has easy fault location as the points are easily accessible. However, more length of wire or cable is needed and that results in greater voltage drop and copper losses.

Activity handling strategy for preparing a married joint:
- Tell the participants that there are numerous types of splice kits and wire connectors available. These kits are used to properly solder wires which has the ability to weatherproof the new splice. This helps in saving money.
- This activity will guide them to learn the proper technique to splice wires and create a weatherproof seal to protect outdoor electronics. For individuals who are new to soldering, wire splicing is a basic soldering skill that will definitely come handy over time.
- Make two groups ask one group to perform four steps and ask the other to perform the remaining of the following steps to get the end product.
  1. Take your wire stripper and strip 3/4 of an inch of the outer insulation from both of the wires you are splicing together.
  2. Take a piece of 8mm shrink tube about 3 inches long, and slide it down one side of the wire bundle.
  3. Once wires are stripped, take a 1/2 inches piece of 3mm Heat Shrink Tubing and place one section over each individual wire.
  4. You can now take the stripped wire ends and wrap them together like in the figure below.
  5. Add a small amount of liquid flux to the bare wire.
  6. With a hot soldering iron, use the side (not the point) to heat the wire and melt the flux. The heated flux will evenly pull the melted solder into the wire.
  7. Once cooled slide your 3mm shrink tube over the wire to cover the newly soldered connection.
  8. Using your heat gun, shrink the tubing, now continue to solder the remaining wires, shrinking each one as you go.
Unit Objectives

At the end of this unit, students will be able to:

• Explain earthing principles and methods

Ask

• Ask the participants if they know what is earthing.

• Ask them to tell the importance of earthing.

Say

Tell the participants that the principles of earthing are developed to ensure:

- Safety of persons
- Protection of equipment

Notes for Facilitator

• Explain to the participants the earthing principles which are as follows:
  - 4-pin power plug and 3-pin plug socket earth pin must be earthed efficiently and permanently.
  - All metal casing that are used to protect the electric supply line or any apparatus should be connected to the earth.
  - The frame or the metallic part of the electrical system must be earthed using two separate and distinct connections with the earth.
  - The middle conductors, in a dc 3-wire system, must be earthed at the generating station.
  - Stay wires, which are used for overhead lines, must be earthed in such a way that it connects at least one strand to the earth wire.

• Inform the participants that the complete earthing system consists of:
  - Earth wire or Earth Conductor
  - Earth Electrode
  - Earthing Lead

• Further briefly explain each component to them.

Say

Tell the participants that earthing can be of two types:

- Equipment grounding
- System grounding
Facilitator Guide

• Tell them that in equipment grounding, all the metal parts that are not carrying current, are interconnected and then they are connected to the earth.

• Tell them that system grounding is used to protect the electrical system from any kind of superimposed voltages that are caused by accidental contact with systems which have higher voltage and lightning.

Notes for Facilitator

• Briefly explain equipment grounding along with its importance.

• Also, tell them that according to National Electric Code (NEC), the resistance of the ground rod i.e. grounding electrode must be less than 25 ohms. The ground resistance has the ability to restrict the fault path current below the circuit breaker trip point.

• In addition, also explain to them that in the figure, the grounding conductor of the same appliance is connected to the chassis.
Unit Objectives

At the end of this unit, students will be able to:

• Describe wiring of basic circuits

Ask

• Ask the participants if they know what a circuit diagram is.

• Randomly choose the participants and ask them about the circuit diagrams of the following:
  - A lamp connected to a switch and battery
  - Two LEDs connected in series with the resistor
  - Three resistors connected in series with a battery

Explain

• Explain to the participants some more basic circuits other than the ones provided in the handbook:
  - DC Lighting Circuit: A DC supply is used for a small LED that has two terminals namely anode and cathode. The anode is positive, and cathode is negative. A lamp is used as a load, that has two terminals such as positive and negative. The positive terminals of the lamp are connected to the anode terminal of the battery and the negative terminal of the battery is connected to the negative terminal of the battery. A switch is connected in between wire to give a supply DC voltage to the LED bulb.
  - Rain Alarm Circuit: The components required to make this circuit are cables, 10K and 330K resistors, BC548 and BC558 transistors, 3V battery, 0.1µf capacitor and speaker.
  - Simple Temperature Monitor Circuit: This circuit gives an indication using an LED when the battery voltage falls below 9 volts. This circuit is an ideal to monitor the level of charge in 12V small batteries. These batteries are used in burglar alarm systems and portable devices.
Wiring of a series circuit using contacts for a motor starter in a steel plant:

Suggested Solution:

1. Connect the 3 two conductor wire cable to the 3 different contacts.
2. Twist one wire of the first contact to one wire of the second contact.
3. Put a cap on the twisted wires.
4. Crimp the cap.
5. Connect one wire of the third contact with the remaining wire of any of the second contact.
6. Put a cap on the twisted wires.
7. Crimp the cap.
8. Connect a resistor to the remaining wire of the third contact.
9. Connect a wire with the other terminal of the resistor.
10. Connect this wire to the Z1 terminal of the Digital Signal Controller (DSC) control panel.
11. Put the second wire that is the remaining wire of the first contact in the common terminal.
Wiring of biometric fingerprint door access for a corporate office:

Suggested Solutions:

1. Identification:
   - Identify the positive and negative terminals of the power supply.
   - On the biometric reader identify the positive, negative, common and normally closed terminals.

2. Connections:
   - Connect the positive and negative terminals of the biometric reader to the positive and negative terminals of the power supply.
   - Connect the common terminal from the biometric reader to the negative terminal of the power supply.
   - Connect the positive and negative terminals of the moon sensor to the positive and negative terminals of the power supply.
   - Connect the common terminal from the moon sensor to the "normally close" terminal of the biometric reader.
   - Connect the cable harness to the moon sensor.
   - Connect the "normally close" terminal from the moon sensor to the common terminal of the open button.
   - Connect an extra piece of wire to the "normally close" terminal of the open button.
   - Connect an extra piece of wire to the negative terminal of the maglock.
   - Bring an extra piece of wire to the positive terminal of the maglock.
   - Connect the extra piece of wire from the push button normally close to the negative wire coming from the maglock.
   - Connect the wire coming from the positive terminal of the maglock to the positive wire of the power supply.

3. Plug in the power supply.
Facilitator Guide

Wiring of an electrical fence for an animal farm:

Suggested Solution:

1. Take a fence energizer.
2. Connect the live wire of the electric fence using insulated jumper wires.
3. Connect the energizer fence terminal (positive) to the insulated jumper wires.
4. Connect the energizer earth terminal (negative) to galvanized metal stakes driven into the ground.
5. Connect the ground wire of the fencing to the grounding rod.
6. Connect the energizer to the main power supply.

Adding of a 220v ac circuit to breaker box:

Suggested Solution:

1. Remove the face plate from the breaker box.
2. Turn off the main breaker.
3. Punch the knockout down from the top of the breaker.
4. Put a clamp in the knockout for wires.
5. Screw the clamp.
1. Punch the knockout from the panel.
2. Put the romex connector on the punched knockout.
3. Insert the home run wires through the connector.
4. Insert the aluminium service entrance cable into the panel.
5. Strip the insulation of the cable.
6. Connect the aluminium wire of the cable to the grounding bar.
7. Connect the ground wires from the home run wires to the grounding bar.
8. Tightly connect all the wires to avoid any short circuit.
1. Connect power to the pin 85 of the relay.
2. Connect the pin 86 to the ground.
3. Connect one end of the switch lead to the positive terminal of the battery.
4. Connect the fuse link to pin 30 of the relay.
5. Ground the load on to the negative terminal of the battery.
6. Take test light and connect it to pin 87.
7. Switch on the power supply.
3. Wiring a Control Panel

Unit 3.1 – Objective of the Module

Unit 3.2 – General Procedures for Wiring a Control Panel

Unit 3.3 – Wiring an Electrical Control Panel
Key Learning Outcomes

At the end of this module, you will be able to:

• List the general procedures for wiring a control panel
• Demonstrate wiring of an electrical control panel
UNIT 3:

Objective of the Module

At the end of this unit, students will be able to:

• Demonstrate the wiring of a control panel
• Describe the sizing and stripping of wires
• Explain panel layout considerations such as space optimization and spacing between wireway and wired devices
• Demonstrate how to install the feeder pipe and branch circuit wires in a panel

Ask:

• Ask the participants to tell what points they think they should keep in mind while wiring any electrical/electronic circuit or panel.
• Ask them to tell how they would identify the correct size of the wire to be used.
• Ask them to recall what wire stripping is.
• Ask them if they know anything about panel layout considerations.
• Enquire whether they know about feeder pipe and branch circuit.
• Ask them if they can add a new circuit to the panel.

Notes for Facilitator:

• Call the participant to list their expectations from the course on the whiteboard/blackboard to enable a discussion.
• Introduce the topics binding to the list of expectations written on the whiteboard/blackboard.
Facilitator Guide
Unit 3.2: General Procedures for Wiring a Control Panel

Unit Objective
At the end of this unit, students will be able to:

• List the good practices of wiring
• Describe the sizing and stripping of wires
• Explain the panel layout considerations
• Ask
  • Start the session by asking the participants if they know what are sensitive components. If you get relevant answer, ask them to list some ways to handle them.
  • Ask if they can show what space should be kept in between wired devices and wireways.
  • Ask them to tell what a wire duct is.
  • Ask if they know how to ensure that the chosen wire size is correct or not.

Notes for Facilitator
• Tell the participants that wiring is their core functional area, so they need to have perfection in it.
• Further explain good wiring practices to them, such as follow the wiring diagram, use stranded wire as specified in the wiring diagram and keep minimum space between wired devices and wireway.
• Further inform them that each panel has its own unique wire size and ampacity—carrying capability. Based on these requirements of a control panel, correct wires should be used.
• Tell them that the choice of a wire to be used in wiring different components of a control panel depends upon the wire capacity, wire gauge and what the wire will feed.
• In addition, explain to them that cables are coated with insulated materials. To join connectors or to prepare cables for setting a connection, they need to strip the insulation of the cables.
• Also, tell them that they have to keep in mind about the safety of wires and cables during wiring the control panel.
• In addition, explain to them the different ways of securing the cables such as:
  • Supporting the cables/wires in such a way that they are not exposed to any mechanical strain.
  • Keeping the terminals free from any undue mechanical strain.
  • Supporting the cables/wire by appropriate means at proper intervals to keep the cables secured from any damage because of their own weight and so on.
Tell the participants that the main focus while designing a layout for a control panel should be on the space optimization and the spacing between wireway and wired devices.

Notes for Facilitation:

- Explain to them that space optimization is the process of efficient and wise use of space. Further explain to them some points that they should keep in mind to achieve space optimization such as:
  - Placing PLC I/O racks in the specified space of the wiring duct so that high density wires can be easily connected to them, routing all wires properly, and keeping the various voltages separated.
  - In addition, tell them some more key points of panel layout such as:
    - Use of shielded cables for low powered signals to ensure less interference.
    - Use of panels that are conductive in nature such as steel. It offers protection against electromagnetic radiation.
    - Use of specified connectors and devices to secure the components in use.
    - Use of different raceways for different types of cables and precautions to be taken while using high and low power devices in the panel to avoid malfunction.
Unit 3.3: Wiring a
Electrical Control Panel

Unit Objective
At the end of this unit, students will be able to:
• Install the feeder pipe
• Install the branch circuit wires
• Add a new circuit to the panel

Say:
Tell the participants that the electrical control panel wiring should be well organized otherwise it can be unsafe or hazardous. Some common hazards are electric shock causing injury or death, arcing, explosion or fire causing burns, fire resulting from an electrical fault and so on.

Tell them that it is important that wiring should be held together neatly using wire ties to ensure that everything such wires and components are in an organized and neat order.

Tell them that it is advisable for everything to be tightly connected and there should be a logical order for the wire connections.

Notes for Facilitator
• Explain to them the steps for wiring an electrical control panel and to add a new circuit to the panel.
• Further explain to them some dos and don’ts of wiring the control panel such as:
  o Do not connect wires outside the panel box.
  o Do not cut wires too short, as it makes wire connections difficult.
  o Do not leave plastic-sheathed cable unprotected.
  o Use a metal box extension on a plastic box. Connect the metal extension to the ground wire in the box using a grounding clip and a short piece of wire.
  o Cables must be connected to metal boxes with an approved cable clamp.
  o Do not use too many wires as they can cause overheating, short-circuiting and fire.
  o Adding a new circuit can be risky, so it is mandatory to follow step-by-step instructions and safety tips.
Wiring of a Pump controller used in a rubber factory:

Suggested Solution:
1. Mount the working components on cover.
2. Mount the control box using round screws to eliminate shorting issues.
3. Hang the box on the first screw.
4. Install a boom screw.
5. Remove the knockouts (circular sections in an electrical junction box used to install wires inside the box) from the control box.
6. Pull the wire through flexible non-metallic conduit and leave at least 8 inches of wire out the end of the conduit.
7. Install the terminal adapter with conduit.
8. Insert the wire through the knockout.
9. Repeat the steps and install another wire in the control box.
10. Keep the wire which is coming from the switch from conduit.
11. Keep the power wire going to the pump on the right.
12. Strip the insulator off all the green, red, yellow, and black wires about ½ inch.
13. Strip the ends of wire coming from the switch.
14. Install terminal block inside the control box.
15. Connect the wire coming from the switch to L1, L2, and power pins of the terminal block.
16. Connect the red, yellow, and black wire of the power wire to the red, yellow, and black pins of the terminal block respectively.
17. Install the cover on the control box.
18. Tighten all the screws.
Facilitator Guide

Wiring of an electrical panel:

1. Insert the aluminium service entrance cable from the top of the electrical panel.
2. Strip the insulator off the entrance cable using the utility knife.
3. Put the two black hot wires each 120V on side loads.
4. Connect the aluminium wire to the grounding bar.
5. Put the neutral wire in the neutral pin.
6. Punch the knockout down.
7. Attach romex connectors to the open knockouts.
8. Use the romex stripper to strip the home runs.
9. Insert the home run wire (wire coming from different rooms of the office) through the romex connector.
10. Label all the cables using label and marker.
11. Connect all the grounding wires to grounding bar.
12. Connect all the neutral of the home run to the neutral bar.
13. Put the individual breakers in the bar for respective home run wires.
14. Connect the home run to the breaker.
15. Turn on the power.
Wiring of a voice dialler to an alarm control panel for a corporate office:

1. Take a two-conductor cable with black and red wire.
2. Strip the ends of the wire.
3. Connect the black wire to the negative of the bell pin of the DSC panel.
4. Connect the red wire to the positive of the bell pin of the DSC panel.
5. Connect the red and black wire with negative and positive terminal of the relay respectively.
6. Take a cable with red and black wire and put the wire in open and common terminal of the relay.
7. Put the wire to the Z1 and Z2 terminal of the voice dialler.
8. Take another cable with two wire.
9. Insert one wire in the auxiliary positive line of the DSC circuit.
10. Insert the second in the auxiliary negative line of the DSC circuit.
11. Connect the positive of the DSC circuit to the positive supply terminal of the voice dialler and negative to the negative.
12. Connect the battery to the DSC panel.
Wiring of the solar panel for a rice mill:
Suggested Solution:

1. Take two 12 Volt 220 watt solar panels.
   • Connect the negative of solar panel to positive of other solar panel to make it 24 Volt panel.
   • Connect the remaining two terminals with the charger controller.
   • Between charger controller and the panel connect a 30-amp fuse.

2. Similarly, take the remaining two 12 Volt 220 watt solar panels and connect them to charger controller. Repeat steps 1a, 1b and 1c.

3. Connect twelve 6V batteries in series to make it three 24 V connections.

4. Connect the output of the charger controller to the battery input.

5. Connect the positive of the battery to a 150 amp or 200-amp fuse.

6. Connect negative terminal of the battery to a 24-volt inverter.

7. Connect the 24V battery terminals to the battery.

8. Plug in the battery tender to the regular AC supply.
Wiring of a smoke detector alarm system for a factory warehouse:

Suggested Solution:

1. Take a four-conductor wire cable and strip both the ends of all wires.
2. Connect two wires to the negative and positive terminals of the smoke detector.
3. Connect the third wire to the fourth terminal of the smoke detector.
4. Take a 5.6k resistor and put its one end in the sixth terminal of the smoke detector and the other in the last terminal, i.e., the eighth terminal.
5. Put the fourth wire of the cable in the seventh terminal.
6. Insert the positive wire from the smoke detector to the auxiliary positive line of the DSC circuit.
7. Insert the negative wire to the PGM of the DSC circuit.
8. Connect the third wire to Z1 of the DSC circuit.
9. Connect the fourth wire to the common terminal next to the Z1 terminal.
10. Connect the alarm to the bell circuit.
11. Connect the DSC to the power supply.
4. Electro-mechanical Assemblies and Cabling

Unit 4.1 – Objective of the Module

Unit 4.2 – Electromechanical Assembly

Unit 4.3 – Cabling
At the end of this module, you will be able to:

• Describe electromechanical assemblies
• List wiring instructions and guidelines for the assemblies
• Describe the panel assembly process
• Identify the labelling methods for the assemblies
• Identify the hazards associated with an assembly process
• Describe cabling
• Recognize different cable handling strategies
• Define colour coding of cables
Unit Objectives

At the end of this unit, students will be able to:

• Explain wiring instructions and guidelines for the assemblies
• Describe the panel assembly process and identify the hazards associated with it
• Identify the different labelling methods of assemblies
• Explain basic concepts of C-cabling
• Demonstrate different cable handling strategies and colour coding of cables

Notes for Facilitator

• Initiate the session with the participants, with a discussion about the objectives of the course.
• You could make the session interactive by asking the participants to share their expectations from the course on the whiteboard/blackboard.
• Introduce the topics to be covered and give some information about them.
• Give the participants a general idea about what will be covered in the course.
Unit 4: Electromechanical Assembly

Unit Objective
At the end of this unit, students will be able to:

• Define electromechanical assemblies
• Describe the components of electromechanical assemblies
• Identify different types of electromechanical assemblies
• List the wiring instructions and the guidelines for wiring assemblies
• Explain working with a panel assembly
• Identify the labelling methods for a control panel and the assemblies
• Identify the hazards associated with an assembly process
• Recognize the methods used to avoid the hazards associated with an assembly process

Ask
• Start the session by asking the participants if they know what electromechanical assembly is.
• Ask them if they can tell about the components of electromechanical assemblies.

Explain
• Electromechanical assemblies make use of electrical and mechanical components to perform a variety of operations, such as, controlling systems having various switches, generating power using electric motors and performing high power mechanical operations. With the advent of integrated electronic circuits, many functions associated with electromechanical assemblies are performed by them. Assemblies such as, control systems, AC/DC power distribution and some computer interfaces, involve complex wiring and component integration which at times is a lengthy process so these types of assemblies need highly trained personnel as they need to perform, hole work to surface mounting, to soldering and circuit layout. Hence, a wireman needs to understand the job well.
• Electromechanical assemblies by telling them that the term electromechanical indicates conversion of the electrical signal to a mechanical movement and vice versa. An electromechanical assembly combines both electrical and mechanical components and some electronic components also.
• Components of electromechanical assemblies are relay, switch, contactor, motor, generator, transformer, solenoid, PLC, diode, resistor, capacitor, transistor and so on.
  o Relay: It is used where it is important to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.
  o Switches: Switches are designed to handle a wide range of voltages and currents.
  o Contactors: Contactors are used to control electric motors, lighting, heating, capacitor banks, thermal evaporators, and other electrical loads.
Transformers: They are necessary for the transmission, distribution, and utilization of AC electrical energy.

Solenoid: A solenoid is a type of electromagnet when the purpose is to generate a controlled magnetic field.

Notes for Facilitation:

- Tell the participants that electromechanical assembly is the process of assembling electromechanical components such as relays and solenoids together. Inform them that electromechanical assemblies can range from simple to complex.
- Explain to them that most of the assemblies are formed by making wire and cable interconnections between boards and sub-assemblies, which can be easily done by cable forms or point-to-point wiring method. Electromechanical assembly not only includes wiring of switches and instruments/devices, but also of control cabinets.
- In addition, also tell them that customized components of electromechanical component assembly include components such as power supply units, wiring harnesses, control panel, and distributor boxes.
- Give them an example of an electromechanical assembly by telling them that an electric motor and a gearbox is an electromechanical assembly that provides rotary action to a system. The gearbox is an assembly of a number of gears that are placed inside a frame or casing. The gears together provide a required torque and speed as output. A gearbox helps to match the power input obtained from a motor with high speed and low torque to the output required.
- Further explain the various components of electromechanical assembly such as relay, switch, contactor, motor, generator, transformer, solenoid, PLC, diode, resistor, capacitor, and transistor.
- Lastly, tell them as a best practice prior to assembling process, they should:
  - Have knowledge of wiring, crimping, wire harnessing, and layout of multicomponent systems.
  - Have hands-on knowledge of various tools such as pliers, crimpers, strippers, and so on.
  - Have good soldering skills for small PCB based assemblies.
  - Be able to understand basic drawings.
  - Know how to handle ESD (Electrostatic Discharge).
- Tell the participants that they have learned what electromechanical assembly is, now they have to study its types.

Electromechanical Assemblies are of the following four types:

- Cabinet Assembly
- Bucket Assembly
Door/Shelf Assembly

- Facilitator Guide

- Cable Assembly

- Tell them these assemblies differ in their layouts as the requirement of these can vary from a box to a panel to sub assembly and so on.

- In addition, the area provided for the assemblies may differ hence an appropriate assembly layout needs to be selected.

Notes for Facilitator

- Tell about the four types of electromechanical assemblies to the participants.

- Further explain to them about each type of assembly.

- Make them understand cabinet assembly by taking an example of wall cabinet assembly.

Following are the steps that needs to be followed in the cabinet assembly process of wall cabinet assembly:

1. Assemble the back panel
2. Assemble the side panel
3. Assemble beam and boom
4. Assemble the top
5. Assemble the boom self
6. Assemble the top self
7. Assemble the unit to be mounted on it
8. Assemble the door

- For more information, visit the link: http://www.sanduskycabinets.com/docs/62_instructions.pdf

- In addition, make them understand bucket assembly by taking an example of Rodent Operant (RO) Bucket. Following are the steps that needs to be followed in the bucket assembly process of RO bucket assembly:

1. Drill the holes in the bucket
2. Assemble the nose poke and drinking well
3. Mount the solenoid valve
4. Assemble the control panel
5. Wire up the control panel and solenoid


- Further explain to the participants the steps that needs to be followed in the cable assembly process:

1. Cut the wires to the desired length using an appropriate wire-cutter tool.
2. Print the wires by a special machine during the crimping process.
3. Strip the ends of the wires.
4. Assemble the cables and clamp them together on an assembly board.
Cable harnesses continue to be made with hand even though there has been a spurt in automation due to the different processes involved such as routing of wires, crimping the terminals onto the wires and inserting one sleeve into another.

Ask them what they understand by term guidelines.
Ask them to list some basic instructions which they follow while wiring.

Notes for Facilitation
Tell the participants that guidelines are a set of rules or instructions that show how to perform a task. Every task has its own guidelines which tell the way in which it needs to be done. Hence, it is important to follow them to perform the task accurately and reduce the risk of accidents.

Explain to them the best practices that should be followed at the time of control panel assembly wiring such as routing of wires and number of wires to be used with the help of following points:

- Use wires of 600V 90°C range that should be a stranded wire of MTW (Machine Tool Wiring) type.
- When wiring across a hinged door or panel make the use of U loop type of wiring as long as possible. Also place the sleeve or spiral wrap over the wires running over the hinge between the anchor points.
- Spacing should be kept in mind between wired devices and wireway. Ideally it should be minimum two inches.
- Minimize the use of large number of cables or wires. Also as a best practice use wire/cable eyes if wire duct is used to cut off the effort during troubleshooting.
- Always run the wires in horizontal and vertical lines and avoid diagonal runs.
- Place Pig tail loops between devices that are spaced such that it makes it easier to remove wiring if the pig tail is added. Consider using High Flex power wires such as "Railroad Wire" or high strand count wire. Train the wire by bending it in the direction you want it to go or lay it in the duct, rather than just trying to lay it in a wire duct and hope it "stays down" in the duct.
- Leave some bare wire to allow visual inspection.
- All the ground connections must be wired with the ground lug. This can be done directly or using a wire in the other ground bus bar. (Although these points are already covered in Mod 3, the scope was good practice of wiring. In this module, the scope is to emphasize these points from assembly's point of view.)
- In addition, tell them some more wiring instructions such as:
  - The minimum spacing between cables should be strictly adhered to, even for cables routed within control panels.
  - The crossing of cables always should be done at right angles.
  - If there is insufficient space to maintain the required spacing between the cables,
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- Then they must be routed in separate cable trays.
- Always screw the cable tray to the uprights of the frame or the cabinet walls.
- Ground the shields of all cables entering the cabinet at the entry point.
- Always use threaded glands to the cables that enter the control panel.
- Do not exceed the given tensile strength of the cables.

Say Tell the participants that now that you have learned the wiring instructions and guidelines, focus on how to work on the panel assembly.

Tell them that the panel assembly process includes setting up of side panels, integrating the required components and sub-assemblies on the board and wiring them, plugging the board with components in the panel and setting up the wiring according to the wiring diagram.

Notes for Facilitator

- Explain to them the preparation and precaution methods that they should do before the assembly process such as use of shielded cables, specified connectors and cables.
- In addition, tell them to take some more precautions such as:
  - Take off any metal objects from your arms or fingers.
  - Keep your hand completely dry.
  - Work in a cool area.
  - Make sure to control ESD.
  - Handle all parts with care.
  - Do not forcefully remove any component/part if it does not come out easily.
  - Never attempt to remove the power source.
  - When inserting/removing any cables or wires make sure to grasp the wire at the base or head to keep it from breaking.
  - Hold the cables and wires from the base or head while plugging in or removing them to avoid breakage.

Further briefly explain to them all the steps involved in panel assembly process.

Ask Ask them to define labels.

Ask them whether they have ever noticed tags on the clothes. If yes, what information the tags contain.
Notes for Facilitation

• Tell the participants that a label is a small piece of paper or any other material affixed to a component or product, on which product-related information is written.

• Labelling means making identification marks on the components so that whoever troubleshoots it can easily grasp the relevant information of that component.

• Relate the component labelling with the labelling of the garments. Tell them that labelling of components is similar to the labelling of garments. Garments have labels which contain information about separate care/treatment, content of stuff, heat resistant or not and so on, so that whoever uses it, can have a clear picture of that garment. Similarly, labels on the components are used to identify or describe circuit components and to provide warnings or instructions.

• Further explain to them the specifications for labelling.

• Explain to the participants some hazards associated with the panel assembly process such as exposure to high electromagnetic fields and fires along with their preventive measures.
UNIT 4: Cabling

Unit Objective
At the end of this unit, you will be able to:

• Identify the cables and wires to be used in an electrical panel
• Describe cable handling strategies
• Define colour coding of cables

Tell the participants that cabling is an important process of the panel assembly. It is the process of preparing cables and setting up a connection.

Tell them that in this unit they are going to study what cabling is, how to select appropriate wires and cables, handling strategies of cables and their colour coding.

Ask them on which criteria they select cables.

Enquire whether they know about safety codes and standards for cabling.

Ask them to classify the wires on the basis of their colour.

Ask them to recall different types of cables and their characteristics.

Notes for Facilitator

• Explanations to the participants some points which they need to consider while selecting cables and wires with the help of the following points:

  • The factors for rating of wires and cables are:
    o Current: The amount of current that you expect will flow through the wire should be an important criterion for its selection. The more the current flowing through the wire, the more will be the heat generated, thereby increasing its resistance. This could harm important devices. Maximum rated current usable for different gauges of wires are clearly given in the tables published by the wire manufacturers. Selection of wires should be done as per these tables. It is advisable to purchase a wire that can carry a little more current than one expects to flow through it.
    o Voltage: Maximum voltage tolerance is also an important consideration while selecting wires. The quality and thickness of the insulation covering the wire determines the maximum rated voltage. Generally, wiring applications don’t have the issue of excessive voltage, except high voltage motors and transformers.
    o Temperature: Heat due to high temperature can become an issue for wires irrespective of the current flowing through them. There are extremely high temperatures, even more than 300 degrees C, at applications such as heavy industry.
Wireman Control Panel and aerospace. Wires with special insulation such as ceramic coating should be used for such high temperature workings.

Frequency: Wire selection needs the frequency, which is going to be applied to it, to be kept in mind as well. High frequencies can cause an unwanted and improper functioning due to the occurrence of “skin effect”. When a conductor receives voltage at a high frequency, the current, instead of being carried evenly through the wire, flows only in its peripheral area. The cross-sectional area of the wire becomes less, as only the “skin” of the wire works as a conductor. This is the “skin effect” and can be prevented by using a bunch of smaller wires known as “litz wire”, in place of a sole copper wire. An aluminium wire, which shows lesser skin effect, can also be used to replace the copper wire.

In addition to the preceding four technical factors, certain other considerations are also there, such as cost and size. Compliance to regulations and industry standards is also essential.

• In addition, also explain to them other factors such as safety codes and standards for cabling and wiring, colour codes of cables and wires to understand the specifications in the wiring diagram and different types of cables and their characters.

• Inform them that different cable handling strategies include insulation stripping, securing of cables and wires, cable routing and cable forming or bending. (Though stripping is already covered in Modules 2 and 3, there the scope was to make participants aware of the terminology. In this module it is important to emphasise this topic again.)

• Tell them that all the cables are coated with insulated materials. Stripping off this insulated material from cables is known as insulation stripping. Further, tell the ways to strip different cables such as electric cords, plastic sheathed cable and coaxial cable.

• Then explain to them that crimping is a method which is used to compress or secure a terminal or contact to a conductor mechanically. Tell them different ways of crimping the wires. (Though crimping is already covered in Module 2, there the scope was to introduce crimping. In this module the scope is crimping the cables for assemblies, so it is important to iterate here again.)

• Further tell them about some best practices of cable routing.

• In addition, inform them about bending of cables. Explain to them the given table that represents minimum permissible bending radius of different cables.

• Inform them that in the process of cable forming, a number of wires that may be of different types and sizes are grouped together to form a single cable. It is similar to cable harnessing.
Tell them the importance of colour coding, further explain to them different colour codes of power cables according to IEC 60445 (2010) standards.

Select the following links for more information:

- [http://ecmweb.com/content/wiring-methods-industrial-machinery](http://ecmweb.com/content/wiring-methods-industrial-machinery)

Wiring of a Temperature Controller for a Food Storage:

Suggested Solution:

1. Weather proof enclosure:
   - Mark the lid of weather proof enclosure for 2 sockets, controller and neon lights.
   - Embed the components (2 sockets, controller and neon lights) in it.
   - Put the temperature sensor at the base of the enclosure.

2. Cut all the cables 8-10cm long (earth, live and neutral) as required.

3. Neon lights:
   - A. Connect the live wire and neutral wire with speed connectors to socket 2 at respective terminals and connect the speed connector end to the blue neon light.
   - Follow same for red neon light. Connect to socket 1.

4. Earth both the sockets (socket 1 and socket 2), connect them with single terminal block.

5. Terminal block:
   - Connect the neutral wire from 2nd terminal block to neutral terminal of socket 1.
   - Interconnect 1st and 3rd terminal block with live wire and 3rd with 5th terminal block.
   - Interconnect 2nd and 7th terminal block with neutral wire.
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1. Connect live wire from 6th terminal block to live terminal of socket 2.
2. Connect neutral wire from 7th terminal block to neutral terminal of socket 2.
3. Connect live wire from 1st terminal block to live terminal of main socket.
4. Connect neutral wire from 2nd terminal block to neutral terminal of main socket.

Temperature controller

5. Connect the live wire from 1st terminal block to 1st port of controller and neutral wire from 2nd terminal block to 2nd port.
6. Connect live wire from 3rd terminal block to 5th port of controller.
7. Connect live wire from 4th terminal block to 6th port of controller.
8. Connect live wire from 5th terminal block to 7th port of controller.
9. Connect live wire from 6th terminal block to 8th port of controller.

Connect the temperature sensor to 3rd and 4th port of controller.

Main switch

10. Connect main live and neutral to 1st terminal block and neutral to 2nd terminal block.
11. Earth the main’s wire to single terminal block.

Connect all the components together.

Inverter Assembly for a Small Office:

Suggested Solution:

1. Wall hour meter:
   - Connect the phase wire attached with 220VAC grid to the wall hour meter and connect the neutral wire to the wall hour meter.
   - Connect the phase wire from the wall hour meter to the phase terminal of main switch box, and then connect the neutral to neutral terminal.

2. Main Switch:
   - Put the MCB in the live wire inside the main switch box.
   - Connect the phase wire to the switch box containing all the ports (load).

3. Connect the batteries in series making a circuit connecting negative of battery B1 to positive of battery B2 and vice versa for other batteries, leaving positive terminal of B1 and negative terminal of B6.
4. UPS Connections:
   - Connect the positive terminal of battery B1 to positive terminal of UPS and negative terminal of battery B6 to negative terminal of UPS.
   - Connect the positive terminal of UPS output socket to the backup ports (load).

5. AC Socket Connections:
   - Connect the phase wire of AC socket to the switch box containing all the ports (load).
   - Connect the neutral of AC socket to the switch box containing all the ports (load).

6. Plug in the UPS in the AC socket.

7. Notes: The load can have various inputs such as tube lights, AC, fan, laptop. Depending on the load, the component used will have varying capacity to bear the current flow. The value of batteries used is directly proportional to the load in the circuit.

Wiring of an Auto Mains Failure system for a Corporate Office.

Suggested Solution:
1. Take an AMF (Auto Mains Failure) controller
2. Connect the negative of the battery to the second pin of the supply terminal (JI) of the AMF
3. Mount the sub panel near to the main panel.
4. Connect the pin 8 and 9 of CANBUS serial interface and configurable inputs (JF) to SAEJ1939 compatible engine.
5. Connect the pin 4, 5 and 6 with resistive sensors.
6. Connect the L1, L2, L3 and N pin of voltage input (JA) to generator.
7. Use protecon fuses on the cable from pin L1, L2, L3 and N.
8. Connect the R, S, T and N pin of the JA to the main voltage.
9. Connect the L1, L2 and L3 pin of the current transformer input (JL) to the input of the current transformers.
10. Ground the common terminal of JL.

12. Connect the output terminal (JC) to relays. The Bek3 provides a common supply rail (JC8). It is a dc supply suited for automatic relays that includes over voltage protection, short circuit protection and EMI protection. You are required to use 90-200 OHM dc coil relays (12 V or 24V according to your engine battery).

Wiring of a Sub Panel with the Main Panel for a Warehouse

Suggested Solution:

1. Take a subpanel.
2. Mount the sub panel near to the main panel.
3. Punch the top knockout of the sub panel.
4. Mount the romex connector to the sub panel to secure 2/0 wire.
5. Punch the side knockout of the main panel.
6. Mount the romex connector to the main panel knockout.
7. Insert the wire through the knockout of the sub panel.
8. Install a 100Amp double pole breaker in main panel to receive 2/0 wire that will feed subpanel.
9. Clean up the main panel wiring.
10. Replace the 20Amp standard breaker with combination AFCI/GFCI breaker.
11. Insert the 2/0 wire to the main panel through the side knockout.
12. Strip the insulator off the 2/0 wire using the utility knife.
13. Apply an oxidation compound to aluminum wiring and landing wiring.
14. Connect the aluminum wire to the ground strip.
15. Connect the landing wire or the neutral wire to the neutral bus.
16. Connect the live wires to the 100Amp double pole breaker.
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Wiring of a Rodent Operant Bucket (ROBucket).

Suggested Solution:

1. Assembling the nose poke and drinking well enclosure
   - Print out the 3D housing. We used Makerbot PLA material printed at a high resolution.
   - Plug three JST SH jumper 3-wire assemblies into three photo interrupter boards. Label the signal wire for each "L" (for left), "C" (for centre), and "R" (for right).
   - Use the nylon screws and hex nuts to secure the photo interrupter boards to the inside of the 3D printed cover and bring the wires to the outside of the cover using the hole in the top lid of the housing.
   - Assemble the blunt needle with the two luer lock pieces, and screw together securely in the top hole in the housing.
   - Place the ½" piece of plastic under the centre poke.
   - Place the faceplate over the housing, such that the plastic piece is clamped in place, and everything is secure.
   - Use two 1.5" 6-32 screws and wing nuts to secure the entire apparatus to the inside of the bucket.

2. Mounting the solenoid valve
   - Using nylon screws and hex nuts, attach the two broom clips to the two 5/16" holes on the side of the bucket.
   - Attach the syringe to the solenoid valve with a piece of tubing that is approximately 1.5". Leave a piece of tubing (approximately 3") hanging off the output of the solenoid.
   - Mount the syringe and solenoid in the broom clips and attach the tubing to the hose barb on top of the nose poke apparatus.

3. Assembling the side panel electronics
   - Place the Arduino Uno so that the top right and bottom left mounting holes align with the top two holes in the side panel. Secure the Arduino board in place using the nylon screws and hex nuts.

Diagram:

ROBucket Wiring Diagram
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screws and hex nuts. Place an additional hex nut between the bucket and the board at each mounting point, to allow for a small space between the Arduino and the bucket.

- Fit the SD shield (with stacking headers soldered on) on top of the Arduino and the LCD shield on top of the SD shield.
- Secure the relay module to the boom two holes in a similar fashion. Orient the relay so that the male pins are on the right side.

4. Wiring up the front electronics

- Place three short pieces of heat shrink tubing around the bundle of 9 wires coming from the nose poke apparatus. Do not heat shrink these yet.
- Route this bundle of wires underneath the relay module (you may want to unscrew it to do this).
- If these wires are long enough to reach the LCD keypad shield, place a crimp connector on the end of each.
- If the wires are not long enough, solder a header wire with a crimp connector on it to increase the length so that it can reach.
- Plug the power and ground wires from the three nose pokes (6 wires total) into the power distributor on the LCD shield, such that each one has its own power and ground.
- Plug the remaining 3 wires from the nose poke enclosure into the input/output pins at the top of the LCD shield, in the following order:
  - Pin 0: Active poke (left)
  - Pin 1: Drinking well (center)
  - Pin 2: Inactive poke (right)
- Use three F/F jumper wires to connect the relay module to the GND and 5V pins on the LCD shield and each IN1 on the relay module to Pin 3 on the LCD shield.

5. Wiring up the solenoid

- Cut and strip one red wire approximately 7" long, and one red and one black wire, each approximately 4.5" long.
- Solder the long red wire, and one of the black wires onto the solenoid, and heat shrink terminals.
- Screw the long red wire into the boom port of the relay module, and the short red wire into the port that's 2nd from the bottom.
- Screw the black wire from the solenoid, and the short red wire into the DC barrel jack.
- Plug the barrel jack Y adapter into the DC barrel jack and the Arduino power input and each to a 9V DC, 650 mA power supply.
Use the following figure to explain the benefits of maintaining memory records:

- Helps list the components within the scope of servicing and those which are not.
- Helps list the possible risks for servicing/replacements of parts with the customer's consent.
- Provides written approval of the customer for any replacement of parts or additional costs.
- Helps keep inventory and stock records of consumables and other parts.
- Helps record time, date, and other call details for future reference.

5. Standard and Guidelines for Wire Control Components

Unit 5.1 – Introduction of the Module
Unit 5.2 – General Specifications of Electric Work
Unit 5.3 – Work and Safety Standards

ELE/N7302
ELE/N9963
Facilitator Guide

Key Learning Outcomes

At the end of this module, you will be able to:

• List general guidelines for electrical work
• Identify electrical codes and standards
• Describe government rules and regulations related to wiring installation
• Recognize work norms and safety standards
1: Introduction of the Module

Unit Objectives
At the end of this unit, students will be able to:

• Explain government rules and regulations related to electrical work
• Describe the general guidelines for electrical work and identify electrical codes and standards
• Explain work norms and safety standards and identify standards to improve work process
• List 5S standards and key elements of Kaizen
• Identify safety standards, preventive measures, and list safety precautions to be taken while working
UNIT 5.1: General Specifications of Electric Work

Unit Objective
At the end of this unit, students will be able to:
• Describe the general guidelines for working with electrical components
• Identify government rules and regulations for electrical work
• Work following different electrical codes and standards

Resources to be Used
• Available objects such as a duster, pen, notebook and so on.

Do
• Welcome and greet the participants.

Ask
• Ask the participants if they know why they must follow standards i.e. rules and regulations while working.
• Ask the participants if they know the full form of the term 'IEC'.
• Ask them if they know the full form of the term 'NEC'.
• Ask them if they can tell the full form of the term 'ISO'.
• Ask them if they can tell the full form of the term 'BS'.

Explain
• Explain that it is very important for them to follow standards while working, as these provide protection. Tell them:
  o Standards are designed to provide safety to persons, livestock and property and to protect them from electrical shocks and fire hazards.
  o While doing electrical work, they are exposed to dangers of various kinds.
  o For this purpose, rules and regulations are passed by the government.
  o These rules and regulations set the technical standards that must be followed while doing electrical work.

Example
• Give an example that all electrical wires are colour coded. For example, the phase wires are red, yellow and blue and the neutral wire is black in colour. This enables the wires to be easily identified.
Wireman Control Panel

Say

- Tell the participants that some of the important rules and regulations by the Indian government pertain to:
  - Amendment to the existing system
  - Drawings
  - Conformity to Indian electricity (IE) Act, IE Rules, and Standards
  - Quality of materials
  - Ranges of components
  - Inspection of materials and equipment
  - Conformity to standards (components)
  - Testing

Explain

- Briefly explain the government rules and regulations.
- Explain the general guidelines that they should follow at the time of wiring a control panel.
- Explain the need for developing and following electrical codes and standards.

Say

- Tell the participants that an electrical code is a set of rules and regulations for electrical wiring.
- They are designed by national and international technical organizations.
- These codes are formulated to ensure that electrical wiring systems are safe and include ways to prevent:
  - Short circuits
  - Ground faults
  - Overheating from inadequate current-carrying capacity

- By using appropriately rated fuses or circuit breakers

Some of the electrical standards adopted all over the world are IEC, NEC, ISO, and BS.

Elaborate

- Elaborate on International Electrotechnical Commission (IEC)
- Elaborate on National Electrical Code (NEC)
- Elaborate on International Organization for Standardization (ISO)
- Elaborate on British Standards (BS)
Tell the participants that:

- The full form of IEC is International Electrotechnical Commission and it is a non-profit, non-governmental, international standards organization.
- It prepares standards for electrotechnology that is electrical, electronic and related technologies such as power generation, fibre optics, semi-conductors, marine energy, home appliances, solar energy, nanotechnology and office equipment.
- IEC was formed to ensure a standard nomenclature and standard ratings of electrical machinery and appliances worldwide.
- The inaugural meeting of IEC was held on 26 June 1906.
- IEC proposed a system of standards known as the SI or the International System of Units.
- It developed and distributed standards measurement units such as Gauss, Maxwell, Hertz and Weber.
- IEC has membership strength of 82 member countries and 82 affiliated countries.
- The national committees of these countries appoint experts and delegates from industry, academia, associations and government bodies to participate in technical work.
- The IEC standards have numbers in the range of 60000 – 799999 and their titles take a form such as: IEC 60228.

Tell the participants that:

- The full form of NEC is National Electrical Code and it is a set of codes and standards used to protect electrical workers and the public by standardizing safe installation of electrical wiring and equipment.
- The NEC is developed by the National Fire Protection Association (NFPA) of the United States and was first published in 1897.
- The National Electrical Code of Bureau of Indian Standards (BIS) takes into account several Indian Standards dealing with electrical installation practices.
- It covers the standard practices for selecting electrical equipment, general safety procedures in electrical wiring and additional precautions to be taken for use of electrical equipment.

Tell the participants that:

- The full form of ISO is International Organization for Standardization.
- It is an independent, non-governmental international organization.
- It has a membership of 163 nations of which the BSI is one of the founder members.
- The ISO gives world-class specifications for systems, products and services to ensure quality, efficiency and safety covering almost every industry.
- This ensures a harmonious development of standards and quality certification.
- The ISO standard related to electrical wiring is IOS9001, which is used for external quality assurance purposes.
- It ensures conformance to specified requirements during several phases of activity including design, development, production, installation and servicing.
Tell the participants that:

- The full form of BS is British Standards and they are developed by British Standards Institute (BSI).
- The BSI started as the Engineering Standards Committee in 1901 to set standards for steel sections.
- Over a period of time, the standards developed to cover a wide variety of industry sectors.
- The standards are continuously reviewed and developed.

Notes for Facilitator:

- Give the participants a brief overview of what all will be covered in the program.
- Start the discussion by involving the participants to join.
- Introduce the topic by discussing government rules and regulations.
- Introduce the topic of electrical codes and standards.
- Ask the students the full form of IEC and then elaborate about its history—why were these standards devised, who devised them and when.
- Ask the students the full form of NEC and then elaborate about its history—why were these standards devised, who devised them and when.
- Ask the students the full form of ISO and then elaborate about its history—why were these standards devised, who devised them and when.
- Ask the students the full form of BS and then elaborate about its history—why were these standards devised, who devised them and when.

Activity handling strategy for:

1. Randomly choose 4-5 participants to match the two columns.
2. Ask each of them to answer and reveal the correct answer at the end.
3. Correct answer of the question is as follows:

<table>
<thead>
<tr>
<th>Colour Code</th>
<th>Disguises two circuits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>A</td>
</tr>
<tr>
<td>Red</td>
<td>B</td>
</tr>
<tr>
<td>Black</td>
<td>C</td>
</tr>
<tr>
<td>Green</td>
<td>D</td>
</tr>
</tbody>
</table>

Table:

<table>
<thead>
<tr>
<th>Current (A)</th>
<th>Adequate Zone (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 x 3 A</td>
<td>M13 3 (x1 1/10 1/0 0/60 3/1 A)</td>
</tr>
<tr>
<td>1 x 5 A</td>
<td>N1 1 (x1 1/10 1/0 0/60 3/1 A)</td>
</tr>
<tr>
<td>590 x 126</td>
<td>ag A</td>
</tr>
</tbody>
</table>

A
Facilitator Guide

UNIT 5: Work and Safety Standards

Unit Objective
At the end of this unit, students will be able to:

• Identify standards to improve work process
• Describe 5S standards
• Describe key elements of Kaizen
• Identify safety standards
• Practice preventive measures
• List safety precautions

Resources to be Used
• Available objects such as a duster, pen, notebook and so on.
• Two toy car mechanic sets

Do

• Welcome and greet the participants.
• Start the session with an activity that will help the participants understand the work standards and the working procedure.

Team Activity: Assembling Toy Car

• Make two groups, and name them Group A and Group B.
• Give one toy car mechanic set to each group.
• Ask them to make the model of a car using the set.
• Give an instruction manual to Group A.
• Do not give an instruction manual to Group B.

Time
• Set 10 minutes as the time for completing the activity.
• Ensure that the activity finishes in time.
• Introduce the topic of work standards and standard operating procedures.

• Explain that group A was able to perform beer as they had clearly written step-by-step procedure.

• Explain that the following standard operating procedures for work will enable them to:
  - Understand their job role and associated responsibilities better
  - Consistently deliver quality work
  - Achieve better productivity
  - Demonstrate their achievements
  - Coach and correct their colleagues

• Explain that there are two standards that enable improvement of work process. These are:
  - 5S
  - Kaizen

• Ask the participants if they know about the 5S standard.

• Ask the participants if they know about Kaizen.

• Draw the following diagram on the whiteboard and explain the five elements of 5S.

  Fig 5.3.1: 5S of Kaizen

- Sorting (Seiri)
- Systematic Arrangement (Seiton)
- Shining (Seiso)
- Standardizing (Seiketsu)
- Sustaining (Shitsuke)
Team Activity

1. Make two groups, and name them Group A and Group B.
2. Give one toy car mechanic set to each group.
3. Ask Group A to dump all the tools of the set in a pile.
4. Ask Group B to arrange all the tools systematically.
5. Ask them to make the model of a car using the set.
6. Set 10 minutes as the time for completing the activity.
7. Ensure that the activity finishes in time.
8. Explain that Group B was able to perform better as they had followed the 5S approach and had an organized workplace with the tools sorted in proper order.

Do

9. Draw the following diagram on the whiteboard and explain the Kaizen philosophy.

Fig 5.3.2: Kaizen philosophy

- Standardize activities and operations
- Measure standardized operations
- Check the measurements against requirements
- Innovate new processes to meet requirements and increase productivity
- Standardize new and improved operations
- Continue the cycle
Say • Tell the participants that the Japanese word ‘Kaizen’ is made up of two words – ‘kai’ which means change and ‘zen’ which means good.

• It is a way of thinking and not a project to complete. It focuses on involving everyone in making continuous small improvements in their job role.

• Tell them about the Kaizen cycle – Plan 'Do' 'Check' 'Act' (PDCA).

• Tell them that Kaizen can also be used in their personal life.

Example • Give an example by mentioning that all of them carry a bag to their worksite. This bag contains all their tools and other equipment/items which they need on a regular basis to perform their job.

• Ask them to:
  ▪ First, spend some me and empty the bag of its content.
  ▪ Sort all the items of the bag according to their use.
  ▪ Arrange them in an order so that whenever they need something they can quickly find it.

• Second, they should reflect on the things they do.
  ▪ They should write down all the different tasks they have to accomplish every day.
  ▪ Make note of any tasks that they are unable to complete due to lack of me.
  ▪ Think of small changes that they can make in their routine to do the same tasks more efficiently and effectively.

• Third, they should remember that kaizen is a continuous process and they should follow its PDCA approach periodically.

Explain • Explain that to ensure safety of products, processes and activities, they should always follow the safety related standards.

• Explain the safety procedures and practices that they must follow in electrical work.

Ask • Ask the participants if they can tell some previous measures that they should follow to avoid any mishap at their workplace.

• Ask the participants if they can tell some safety precautions that they should take while working.
• Write the preventive measures told by them on the whiteboard.
• Discuss each point one by one.
• Add any point missed by them.

Explain:
• Explain the importance of using safety precautions while working with electricity.
• Tell them that any non-conformance to safety precautions can result in:
  - Injury to them
  - Injury to someone else
  - Damage to product or property
• Tell them that there are four types of injuries caused due to negligence while working with electricity. These are:
  - Electric shock
  - Burns
  - Falls
  - Electrical
• Explain that they should always adhere to the important safety clauses of IE rules, 1956.

Notes for Facilitator:
• Give the participants a brief overview of what all will be covered in the program.
• Start the discussion by involving the participants to join.
• Ensure that you have two full working mechanic sets before starting the session.
• After the end of team activity, ask both the groups to show their models.
• Ask them to observe that Group A’s model is better than Group B.
• Explain about the importance of having standard operating procedures.
• Ensure that you shuffle the members of Group A and B before starting the second team activity.
• After the end of team activity, ask both the groups to show their models.
• Ask them to observe that Group B’s model is better than Group A.
• Introduce the topic of Kaizen philosophy.
• Introduce the topic of safety standards.
• Activity handling strategy for Choose the Correct Alternative:
  - Randomly select 4-5 participants to answer the questions.
  - Ask each of them to answer one by one and reveal the correct answer at the end.
  - Correct answer of the first question is standards.
  - Correct answer of the second question is insulated gloves.
  - Correct answer of the last question is systematic.
Use the following figure to explain the benefits of maintaining mely records:

- Helps list the components within the scope of servicing and those which are not
- Helps list the possible risks for servicing/replacements of part with the customer's consent
- Provides written approval of the customer for any replacement of parts or additional costs
- Helps keep inventory and stock records of consumables and other parts
- Helps record time, date and other call details for future reference

6. Role of a Wireman

   - Introduction of the Module
   - Understanding Work Requirements
   - Responsibility of a Wireman
   - Organizational Context
   - Adhering to Health and Safety Norms
   - Improving Work Process

ELE/N7302, ELE/N9962, ELE/N9963
Key Learning Outcomes

At the end of this module, you will be able to:

• Identify work requirements
• Manage work as per given responsibility
• Handle materials correctly
• Report as per schedule and maintain proper documentation
• Follow the health and safety norms
• Identify ways to improve the work process
Unit Objectives
At the end of this unit, students will be able to:
• Identify the work requirements of a wireman and manage the work as per the given responsibilities
• Report to their supervisor and maintain the documents
• Identify ways of improving work processes and follow health and safety norms.

Ask
• Ask the participants if they know about the work processes they have to follow.
• Ask the participants if they can tell whom they should report to.
• Ask the participants if they are aware of hazards at their work places.
UNIT 6

**Unit Objective**

At the end of this unit, students will be able to:

- Identify the right way to interact with the supervisor
- Identify the correct way to interact with colleagues

**Ask**

- Start the session by asking the participants if they can distinguish between interacting with a supervisor and that with colleagues.
- Ask the participants if they can narrate any incident where there was a conflict between a participant and a co-worker.

**Say**

- Make the participants understand the difference between communicating with a supervisor and a colleague.
- Give tips on interacting with the supervisor:
  - Explain to the participants how to resolve issues in case of a discord with the supervisor.
  - Tell the importance of understanding the work requirements properly as it will enable them to deliver quality work.
  - Explain to the participants about what they would need to discuss with the supervisor, to plan the approach of work accordingly.
  - Explain how the participants can learn by observing and considering the supervisor’s preference.
  - Tell the participants that they should never delay the supervisor while on his/her way out.
  - Tell the participants that they should not drag a meeting after it is over.
- Make the participants aware of the reporting structure they need to follow.
- Highlight their scope of work as an individual.
- Discuss with the participants about:
  - Importance of working with proper coordination in a team.
  - Basic conflicts that may arise between them and a co-worker or a supervisor.
  - Topic of communication to ensure they understand the possible consequences of lack of communication or miscommunication while working.
  - Possible disruptions at work which may hamper the workflow.
Explain to the participants how they can have a relationship with their manager giving examples like:

- There will often be moments when you may disagree with your manager and end up in a conflict. You may not be able to solve every disagreement but there is always an opportunity for a common point of view.
- It is important to pay attention to your supervisor's communication preferences. There may be an instance when a supervisor is more comfortable with a verbal status rather than a written one.
Facilitator Guide

UNIT 6.3: Responsibility of a Wireman

Unit Objective

At the end of this unit, students will be able to:

• Identify the skills required for the work of a wireman
• Identify standards and codes for the work of a wireman
• Categorize work as per the drawing and manuals

Say

• The participants should be given knowledge about the wires they would be working with.
• They must be given thorough information about the standards and electrical codes.
• They must be explained how to interpret different wire diagrams.

Explain

• Explain to the participants how they need to collect cables and wires and execute proper positioning of a panel.
• Explain the basic responsibilities of a participant:
  o Install new wiring
  o Repair old wiring
  o Fix errors of an electrical panel
  o Assemble components of a control panel

• Share a table of codes and standards with them and explain the importance of adhering to it.
• Explain to them in detail how to read instructions and warnings, other textual labels or information written on the components of the product.
• Discuss the most common errors, their causes and measures to prevent them. Give them examples:
  o Errors caused by use of a Digital Multi Meter (DMM) in an incorrect setting.
  o Not enough insulation to prevent electrical shocks.

• Recall the wire diagrams done in module 2 to reiterate that wiring of the control panel is the key role and responsibility of a wireman.
• Explain to the participants that the components and equipment must be used and maintained properly.
To facilitate the activity of management:

- Give each participant any three of the following and ask them to classify them as 'urgent', 'important' or 'waste of me':
  - Managing tools
  - Testing the wire connections
  - Securing unsafe wiring
  - Surfing the phone
  - Changing with friends
  - Reporting to the supervisor in case of a mishap
  - Sharing work status with supervisor
  - Coordination with the team for completion of work
UNIT 6.4: Organizational Context

At the end of this unit, students will be able to:

- Identify the organizational context
- Follow company policies and rules
- Maintain records and complete forms

- Ask the participants to tell what they should report and to whom.
- Ask them if they know about their role as per the workflow.
- Ask the participants which documents they will have to fill in and submit.

- Share a template of a work order such as the following one and guide the participants in comprehending it.

- Explain to the participants what organizational context refers to—such as work division/department, work unit or work role.
- Explain to them that they need to be aware of set protocols like:

![Work Order Template](image)
Follow rules and policies laid down by the company

Follow the structure of reporting and ordering

Adhere to the defined role of work

Complete the documentation process

- Explain the common policies of the company which include the following:
  - Reporting and dispersing on time
  - Not carrying out illegal activities
  - Coordinating with colleagues to effectively complete deliverables
  - Following a proper code of conduct in terms of behaviour and work output

- Explain the importance of filling forms and submitting to the respective person for record-keeping. For example:
  - Filling up a form which would include the name of the employee, age, address, contact number, blood group and also a section containing a close aide's name and contact information, who can be contacted in case of an emergency. It would also include a section which lists the employee's allergies, if any.
  - Updating forms or a database to fill invoice details.
  - Updating an attendance sheet for record-keeping.
  - Filling up leave application forms for planned leaves.
UNIT 6: Adhering to Health and Safety Norms

Unit Objective
At the end of this unit, students will be able to:

• Identify safety issues at work
• Identify health issues at work
• Practice the preventive measures to be taken

Ask
• Ask the participants if they can list the steps to be taken in case a fire breaks out.
• Ask them to name the safety gears a wireman should use.
• Ask the participants to tell why it is necessary to receive health and safety training.
• Ask them about the common errors which may lead to a mishap.
• Ask the participants to list a few potential hazards.
• Ask them about the basic first aid steps by giving them the following situations:
  o A co-worker faints
  o A co-worker burns his/her finger
  o Someone suffers a bee sting
  o Someone chokes while eating

Explain
• Explain to the participants how providing health and safety information helps to ensure that the employees work safely and without risks to their health. For example, it is essential for the workers to understand:
  o The need of wearing safety gears as soon as they commence their work.
  o The importance of maintaining a correct posture while working, to avoid health hazards.
  o The basic first aid measures so that he/she may help a victim.
  o The importance of identifying, reporting and escalating any potential hazard.
  o The basic health guidelines drawn by the company.
  o The need to assess and control risks.

• Tell that effective health and safety training shall help them in being competent during an unforeseen mishap. For example:
  o Electric shocks
  o Falls
  o Burns
  o Inhaling any foreign body
  o Cuts
Explain to the participants about Electrostatic Discharge also known as ESD. Tell them how ESD is harmful for sensitive components while assembly of the device, production, and shipping. Microchips can be damaged by ESD. To prevent ESD, grounding is crucial. A Human Body Model (HBM) is a frequently used model for testing the vulnerability of electronic equipment to ESD from human contact. This ESD simulator shows the discharge that might happen from an electronic device due to human touch.

- Talk about the protective gears which are used while handling components prone to ESD—wire strap, gloves, and safety apparel worn while working.
- Explain the proper handling of tools, equipment, and hazardous materials.
- Explain the importance of using safety gears such as wrist strap, gloves, and proper clothing.
- Explain to them the method of using a basic equipment like a fire extinguisher or raising a fire alarm.
- Tell them about the procedures they are required to follow in case of emergencies.
- Explain to them in detail about providing first aid.
- Explain the importance of maintaining a proper posture while working.
- Tell the participants about the signs typically used to signal an emergency.
UNIT 6: Improving Work Process

Unit Objective
At the end of this unit, students will be able to:

• Identify ways to improve the work process

• Explain to the participants how small process improvements can be set up and executed in a short period of time.

• Explain how zero-defect work can be achieved. Tell the participants that zero defects mean that there should not be any wastage while working on an existing project.

• Explain that Zero defects theory is based on four fundamentals for successful implementation of projects.
  
  1. Quality means adhering to requirements. Understanding and fulfilling requirements as per instructions and guidelines is an assurance that quality will be achieved.
  2. Quality should be taken care of right at the beginning. It is less cumbersome and expensive to prevent defects than to discover and correct them later.
  3. Quality is measured in monetary terms. Defects imply hidden costs like wasted material, rework, labour, customer dissatisfaction and lost revenue.
  4. Quality should be maintained according to the zero defects theory. Mistakes are not inevitable. Perfection in work, and not just being good, should be the aim.

• Explain to the participants that anything during the project, which is unproductive and does not add value to it, should immediately be removed.

• Tell them the importance of quality in work and timely delivery.

• Explain the importance of reporting to the supervisor in case of a change in project plans.

• Explain that work done should comply to set standards and regulations of the company.

• Tell the participants that a clean work area will make them feel positive about the work and help them avoid waste of time.

Notes for Facilitator

• To facilitate a discussion, refer to the following questions to encourage the participants to answer:
  
  ▪ Maintaining a clean work environment
    1. What should you do if you see a workstation with various equipment scattered on it?
    2. What should you do if you see some machine oil spilled on the floor?
    3. What should you do if you see pieces of paper and wire spread all over your table?
What steps should you take to enable yourself to complete your work on time?

What are the few non-technical factors which may hamper deliveries?

What can be the technical factors responsible for a delay in a delivery?

Achieving Zero defect in work

Do you think inappropriate lighting can hamper the quality of work?

What would you do if the quality of wires provided to you to connect a control panel is poor?

Do you think wearing or not wearing safety gear will make a difference while working on a circuit breaker?

To facilitate identification of potential hazards, give the participants an example.

Tell them how while working an employee used to slouch too much while sitting on the chair. Despite being asked to use preventive measures, the incorrect posture of working led to a severe backache for a long period of time.

Further ask the participants to describe any of their experiences of spotting a potential hazard related to health and safety before moving on to attempt the questions.
Use the following figure to explain the benefits of maintaining merely records:

- Helps list the components within the scope of servicing and those which are not.
- Helps list the possible risks for servicing/replacements of part with the customer's consent.
- Provides written approval of the customer for any replacement of parts or additional costs.
- Helps keep inventory and stock records of consumables and other parts.
- Helps record time, date, and other call details for future reference.

Unit 7

1. Introduction of the Module
2. Interact with Supervisor
3. Interact with Colleagues
4. So Skills
Key Learning Outcomes

At the end of this module, you will be able to:

• Identify the right way to interact with supervisors and colleagues
• Use soft skills required for doing the job
### UNIT 7

#### Introducon of the Module

At the end of this unit, you will be able to:

- Identify the work requirements clearly for the work assigned to them
- Identify the importance of working in a team
- Demonstrate the ways to efficiently communicate with team members
- Describe the skills that would help them work efficiently with colleagues and supervisors

#### Ask

- Ask the participants if they know what the job of a wireman is and what does it involve.
- Ask the participants to tell what according to them are the skills required to do the work of a wireman.
- Ask them if they know whether a wireman works in isolation or in a team.
- Ask them to share their expectations from this course.

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**Note:** The page contains content in a language other than English. The text is not directly translatable and appears to be a mix of symbols and characters.
UNIT 7 - Interact with Supervisor

Unit Objective
At the end of this unit, students will be able to:

- Define work requirements
- Identify the right work ethics
- Identify what customer feedback is

Ask
• Start the session by asking the participants what they think the job of a wireman is.
• Ask them to tell if they know about the skills required to do the work of a wireman.

Say
• Understand the task which must be performed. This includes understanding:
  - The requirements of the task
  - The need to be competent and knowledgeable to do the task
  - The need for an ability to solve the problem
• Understand that the supervisor is assigned to get the work done. One should always follow the chain of command or the line of authority for a smooth flow of work.
• Understand the various tools and equipment which will be required to perform the task.
• You should keep abreast with new developments and new product models that are in the market. Ask your supervisor if he knows about any new product or new developments that are in the market. Read about them in magazines, journals and on websites.
• Always plan and organize your work for greater efficiency. You can keep control on your work by measuring it against the standard or the benchmark.

Ask
• Then, ask the participants what work ethics are and are there ethics involved in the work of a wireman.
• Also, ask them why the feedback of the customer is important.

Notes for Facilitator
Tell the participants that for certain urgent matters, it is the duty of the wireman to report to the supervisor or interact with him immediately. Some examples include:
• You notice a safety breach, which can result in an accident. You must escalate the matter to your supervisor.
You notice an unethical action happening around. You must report to your supervisor.

You notice any other work-related issues, which may raise a concern. You must escalate the matter to your supervisor.

Tell the participants that feedback helps to understand the problems and the good things in the work which you have done. It helps to outline the scope for further improvement. It also makes the customer feel happy that they can give feedback regarding the service. The feedback also helps the supervisor monitor your work, efficiency, and other key performance aspects of your work that may relate to appraisals and further assignments.

Tell the participants to remember that all the members of a team, whether a senior or a junior, may work together or may work on individual projects to fulfill the organizational goals. Therefore, it is important to understand that the role of each team member is significant for the organization.

The process flow of the work that takes place in a day in the life of a wireman includes:

- Issuing the tools from the stores. Ensure that you issue the tools and use them properly and return after use.
- You may also have to address customer complaints.
- You should also help your colleagues, if it is required.
UNIT 7.3: Interact with Colleagues

**Unit Objective**
At the end of this unit, students will be able to:

- Define the role of the team members
- Identify the workplace relationships
- Identify work behavior

Highlight to the participants the importance of the following:

- Working in a team. Team members must be aligned to the targets and must work in coordination and harmony.
- All the members are different and each one has a special quality to be in the team.
- Adherence to rules and quality is important.

Explain:

- Explain to the participants that the work that is assigned to them will also have certain timelines which they should follow. It is important to adhere to the targets and timelines so that there is no conflict between team members and also no delay.
- Work done should always match to the company delivery standards. There are incentives for the work done well. Be aware of such incentives and try to achieve them. This leads to having a sense of satisfaction and achievement.
- The manager has certain duties and responsibilities. It is the duty of the manager to get the task done, which may not be involving working directly on the control panel.
- Similarly, a supervisor may be directing working on the wiring process however the work involves getting all the wiremen to perform the task as per the blueprint and maintain healthy and safe working conditions.
- The wiremen should be able to work in harmony with colleagues or members in the team. In case of any conflict the manager should be consulted by communicating with them. If the need for an intervention by a senior is felt, then the manager should be reported to the supervisor.
- While doing work and any interaction related to work the interest of the organization should be the focus.
- All the members may work together or may work on individual's projects to fulfill the organizational goals.
- It is important to understand the role and responsibility of each one of the team members and the task being performed by that person.
To facilitate the role play:

• Ask one participant to play the role of the supervisor and another one to be Ravi.
• In case the participants hesitate or do not know where to begin, provide them hints, such as the basic roles and responsibilities of a wireman. Ask them that in case of any task or emergency or report, whom should they contact, and once their task for the day is over, then whom should they report to or inform about the day's tasks.
• Explain to the participants that the objective of this role play is to understand:
  o Role of a supervisor
  o Role of a colleague
  o Work of a wireman
  o Role and responsibility of each team member
• Ask the participants to prepare for the role play for 15 minutes and then perform it.
• Prepare the following:
  o Supervisor
    ▪ Work schedule and a wire diagram
    ▪ Line of command chart
    ▪ Important safety equipment
  o Colleague
    ▪ Important things while at work
    ▪ Show good relation and helpful attitude
    ▪ Use of safety equipment
    ▪ Other important things at work
  o Ravi
    ▪ Show positive learning attitude
    ▪ Ask questions and show eagerness to learn
UNIT 7 - So Skills

Unit Objective

At the end of this unit, students will be able to:

• Identify good communication skills
• Explain teamwork
• Demonstrate decision making skills
• Recognize reflective and critical thinking skills

Communication is a two-way process. The sender of a message, who has a need to communicate with another person, the receiver of the message, can send a message. This happens in a medium and then reaches the receiver who then responds, based upon the understanding of the message.

Communication can be said to be complete only when the receiver understands the message in context in which it was meant to be understood.

Give an example. In the morning when you join for work, your supervisor gives you a wire diagram and tells you the task which has to be performed (Message). Wire diagram is the written medium of communication. The telling becomes the spoken communication. In this case you are the receiver of the message. When you respond after having understood the message, it becomes a feedback.

Tell the participants that communication includes:

- Verbal Communication – It mainly consists of the spoken words, such as, you are talking to your team members or talking on phone with the customer.
- Non-verbal Communication – It consists mainly of gestures, facial expressions and movements. You show a thumb up to say that the connection of wiring is done to your assistant, who is far away, or you call your assistant by waving to come closer with the cord.
- Written Communication – It is the written form of communication such as, reports, analysis and emails. The wiring diagram, which is a written document, a report which has been submitted or an application, all are examples of written communication.
Then inform the participants about some basic dos and don'ts of communication using the following points:

**Dos**

- Communication should be very clear and precise. Mention all the details required to take action. Also, mention clearly the action intended.
- Do not communicate when you are not sure. Also, never give incorrect details.
- Communication should be concise or short. It should not have irrelevant details which is of no concern to the recipient of the message. Never give incomplete message.
- Communication should be concrete. Mention the specific and actionable things. Never communicate in an uncourteous way.
- The message in communication should be coherent or should be related. If you have to mention something extra, then mention clearly that it is an addition. Meaning is derived when the entire message is in context.
- Do not use jargons that the recipient may be unfamiliar with. Do not use complex words or sentences.

**Don'ts**

- Communication should be very clear and precise. Mention all the details required to take action. Also, mention clearly the action intended.
- Do not communicate when you are not sure. Also, never give incorrect details.
- Communication should be concise or short. It should not have irrelevant details which is of no concern to the recipient of the message. Never give incomplete message.
- Communication should be concrete. Mention the specific and actionable things. Never communicate in an uncourteous way.
- The message in communication should be coherent or should be related. If you have to mention something extra, then mention clearly that it is an addition. Meaning is derived when the entire message is in context.
- Do not use jargons that the recipient may be unfamiliar with. Do not use complex words or sentences.

**Explain**

Explain to the participants that to be able to listen actively and to ensure that they can respond and understand efficiently, they need to:

- Stop talking to listen to what the other person has to say.
- Remove any external noise or distractions.
- Do not jump to a conclusion or respond the moment the other person begins to speak.
- Try not be defensive in a conversation, especially when you are receiving a feedback.
- Show your interest in listening to a person who is speaking through non-verbal clues such as a nod or words such as hmm, yeah and so on.
- Ask for details to get the complete information.
- Filling up leave application forms for planned leaves.

**Notes for Facilitation**

Finally, explain to the participants the concept of teamwork and team building. Tell them that:

- Teamwork is defined as coming together of people to achieve a common goal. The goal here is the organizational goals. The daily tasks which are assigned are a part of the organizational goals. Teamwork means that each member in the team is contributing equally to the tasks.
In a team, all the members are important and might be dependent on each other for work. Sometimes the members do the work individually. However, the collective result is a team effort, similar to what you will see in a game of cricket or during the construction of a building or building an aircraft. It is also important to understand that the work may depend on the completion of your task. Therefore, for the smooth progress of work you should complete your task on time.

- For the activity, The Communication Game, do the following:
  - Tell the participants that the objective of the activity is to understand the importance of the following:
    - Verbal communication
    - The type of instructions which should be given
    - Feedback
    - Direct interaction with the concerned person for proper communication.
  - Take 5 minutes for each activity. Ensure that you have simple and not too complicated images, which can be work related or general.
  - Make the participants sit back to back or behind the board and then pass the instructions to draw.
  - Later, after the activity, you can comment on how the instruction passing and interpretation could have been better.

- For the activity, Case Discussion, do the following:
  - Tell the participants that the objective of the activity is to understand the importance of the following:
    - Planning and scheduling of work
    - Organizing task
    - Handling work pressure
    - Maintaining helpful but assertive behaviour
    - Being responsible and accountable for work
  - Make four groups. Let the participants discuss the case for 20 minutes and come up with solutions for their colleagues. Have a presentation where all the groups should individually present the case.

- For the activity, Team Game, do the following:
  - Tell the participants that the objective of the activity is to understand the importance of the following:
    - Non-verbal communication
    - Leadership
    - Teamwork
  - Make two groups. The more the number the better. One participant can act as the leader and guide the team to stand as per their date of birth, in ascending or descending order. They cannot talk but can use non-verbal gestures to do this activity.

- For the activity, A/B/A 245, B245, 1A44, 4A12, the objective is to understand the importance of the following:
  - Cultivate
  - A245, B245, 1A44, 4A12
  - 20.545, 20.545, 20.545, 20.545
  - 20.545, 20.545, 20.545, 20.545
  - 20.545, 20.545, 20.545, 20.545
  - 20.545, 20.545, 20.545, 20.545
Ask the participants what decision making is. Ask them if they think that decision making is difficult and the reason for it. Ask them to tell what they know about reflective thinking. Also, ask the participants what they understand by the term “critical thinking.”

Tell the participants about the decision-making process and its steps. Use the following pointers to explain the steps:

1. The first step in a decision-making process is to identify the problem.
2. Then, gather details about the problem and its possible solutions. The more data you have, the better decision making you can do.
3. The third step is to analyse the problem. You may need to use mathematical or statistical tools to arrive at a point, which will help you to take a decision.
4. Develop alternatives, which will help to have a plan B in case plan A does not work.
5. Finally, choose the best option.

Then, tell the participants about some pointers that they need to keep in mind for decision making and critical thinking, such as:

1. It is based upon previous knowledge and you will draw your learning from it.
2. It will help you to understand the process and suggest improvements by eliminating the waste.
3. It requires you to be thorough with the process and also be updated with new developments.
4. Critical and reflective thinking will help to spot the process disruptions and the reasons for it.
5. Analyse the reason for the delay and how the improvements can be done.
6. The critical thinking process can be defined as given in the following figure:

Fig 7.4: Critical thinking process
Use the following figure to explain the benefits of maintaining merely records:

- Helps list the components within the scope of servicing and those which are not.
- Helps list the possible risks for servicing/replacements of parts with the customer's consent.
- Provides written approval of the customer for any replacement of parts or additional costs.
- Helps keep inventory and stock records of consumables and other parts.
- Helps record time, date and other call details for future reference.

UNIT 8.

1. Introduction of the Module

2. Safety Measures and Standards

3. Occupational Health and Wellness

4. ELE/N9963
At the end of this module, you will be able to:

• Identify the safety guidelines
• Use safety equipment efficiently
• Demonstrate safety measures
• Practice emergency procedures
• Demonstrate handling of heavy and hazardous materials
• Maintain good health
• Participate in health sessions
UNIT 8

1. Introduction of the Module

At the end of this unit, students will be able to:

• Explain safety measures and standards at work
• Demonstrate safety guidelines that should be followed at workplace
• Identify various safety equipment required and demonstrate safety measures
• Explain emergency procedures and demonstrate handling of heavy and hazardous materials
• Understand the importance of maintaining good health and participating in health sessions
UNIT 8

UNIT Objective

At the end of this unit, students will be able to:

• Discuss the safety guidelines
• Identify the safety equipment
• Demonstrate the safety measures
• Practice the emergency procedures

Resources to be Used

• Available objects such as a duster, pen, notebook and so on.
• Protective equipment such as a helmet, gloves, goggles and so on.
• Portable fire extinguisher

Ask

• Ask the participants to tell some safety guidelines that they should follow at workplace.
• Ask the participants if they know what the term 'ESD' stands for.
• Ask them if they know the meaning and potential causes of ESD.
• Ask them if they can tell how to reduce the risk of ESD.

Say

• Understand the task which must be performed. This includes understanding:
  - The requirements of the task
  - The need to be competent and knowledgeable to do the task
  - The need for an ability to solve the problem

• Understand that the supervisor is assigned to get the work done. One should always follow the chain of command or the line of authority for a smooth flow of work.

• Understand the various tools and equipment which will be required to perform the task.

• You should keep abreast with new developments and new product models that are in the market. Ask your supervisor if he knows about any new product or new developments that are in the market. Read about them in magazines, journals and on websites.

• Always plan and organize your work for greater efficiency. You can keep control on your work by measuring it against the standard or the benchmark.
Do

- Draw the following diagram on the whiteboard to explain the causes of ESD.

Fig 8. 2.1: Causes of ESD

- Show the personal protective safety equipment to them.

- Explain that it is very important for them to use safety equipment while working as they provide protection to various parts of their body.

- Inform the participants that always remove rings, chains or bracelets or other metal objects before working on the panel. Also, tell them that they should use the prescribed protective safety equipment such as rubber shoes, helmet, gloves, and so on.

- Tell them that:
  - Goggles provide them eye protection from hazards such as electric sparks, minute flying particles and dust.
  - Helmets provide protection from injury to head from falling objects and slipping and tripping.

**Causes of ESD**

- PCB is handled without using an electrostatic wrist strap
- Synthetic materials such as plastic, vinyl, or Styrofoam are placed near electronic equipment
- Movement of air near electronic components
- Human body and material of clothes (synthetic)
- Unplanned and careless human movement
- Improper grounding
- Unshielded cables and components
Facilitator Guide

- Gloves provide hand protection from hazards such as harmful substances, cuts and abrasions, chemical or electrical burns and so on.
- Shoes provide foot protection from hazards such as electrical shock, falling of hot or heavy objects and slippery floor.
- Ear plugs provide hearing protection from extreme noise levels.
- ESD pins provide protection from electrostatic current which can cause electric shocks.

Demonstrate
- Demonstrate the procedure of using a fire extinguisher.

Activity
- Conduct a mock fire drill.

Time
- Set fifteen minutes as the limit of the activity.
- Ensure that the activity finishes within the time.

Explain
- Briefly explain the steps of a fire drill.
  - Fire evacuation strategy: Make a clear and concise evacuation plan that meets the need of your building and its occupants.
  - Action on hearing the fire alarm: Everyone should respond to the sound of the fire alarm and exit in an orderly manner.
  - Calling the fire brigade: Call the fire department and give them your location.
  - Identification of key escape routes: Plan at least two emergency exits so that if one is blocked, the other can be used.
  - Appropriate use of the fire extinguisher: Demonstrate the correct way to use a fire extinguisher.
  - Correct use of the emergency evacuation plan: Appoint someone to monitor the drill and measure the duration of a complete evacuation.

Explain that after completing every fire drill they should:
- Record the total evacuation time.
- Silence the alarms.
- Ensure that the fire alarm system is back to normal operating condition.
- Re-evaluate any concern that arose during the fire drill and discuss it.
- Keep record of the fire drill and of any notes on the evacuation checklist report.
tell the participants that to make the workers capable of handling emergency situations, workshop trainings are conducted.

tell that the mock fire drill they just conducted is also an integral part of the workshop training.

explain that the employee workshop training would include:

- roles and responsibilities of the wiremen
- threats, hazards, and precautions to be taken
- notification, warning, and communication procedures in case of an emergency
- evacuation, shelter, and accountability procedures in case of an emergency
- emergency shutdown procedures

ask the participants if they know what to do in case of an emergency, a fire or an accident.

explain that they should follow certain procedures:

- in case of a fire:
  ▪ try to remain calm.
  ▪ pull the fire alarm.
  ▪ move quickly to the nearest exit.
  ▪ use the staircase, do not use the lift.
  ▪ assist others in evacuating.
  ▪ call the fire station and give your location.

- in case of an accident:
  ▪ determine the extent of injury.
  ▪ provide first-aid for minor injuries.
  ▪ inform medical personnel and paramedics.
  ▪ avoid moving or shifting the injured.

- in case of an emergency such as an earthquake:
  ▪ take shelter under tables, desks and so on.
  ▪ stay away from the windows.
  ▪ leave the building as soon as it is safe.

- in case of a violent or threatening person:
  ▪ try to remain calm.
  ▪ do not confront the person.
  ▪ do not try to subdue the person.
  ▪ inform the security as soon as it is possible.
• Give the participants a brief overview of what will be covered in the program.
• Start the discussion by involving the participants to join.
• Introduce the topic by discussing safety guidelines.
• Write the safety guidelines mentioned by the participants on the whiteboard.
• Add any point not covered by them.
• Go over each point one by one and explain it in a few sentences.
• Explain the full form of the term ‘ESD’ and its meaning.
• Go over the causes of ESD one by one and explain each point briefly.
• Write the ESD safety guidelines mentioned by the participants on the whiteboard.
• Add any point not covered by them.
• Tell them that they should:
  o Hold the IC by its body and not by the pins.
  o Hold the PCBs by their edges.
  o Never place the components on a metal surface. This is so because there is a static charge in metal surfaces which can cause damage to the sensitive electronic parts.
  o Leave all the electronic components in their ESD-safe packaging all the time they are not in use.
  o Never touch anyone working on integrated circuits. This is so because everybody has a charge and touching someone who is grounded can lead to ESD.
  o Desist from wearing synthetic clothing such as polyester because there is an electrostatic field surrounding these nonconductors and it cannot be removed completely.
• After going over the safety guidelines, introduce the topic of safety materials and equipment.
• Next, tell them that the most important safety equipment is the fire extinguisher.
• Explain its importance as a first level of protection against any fire hazard.
• Explain the purpose of conducting a fire drill.
• Tell them that after completion of every drill they should evaluate the effectiveness of the drill.
• Tell them that to be effective, the fire drill should be carried out periodically and should use different escape routes every time.
• Next, tell them that the fire drill is a part of employee workshop training.
• Explain that every organization has an emergency plan to manage any emergency or accident that might occur.
• Tell them that they should be aware of the procedures to be followed in case of any emergency.
Unit 3: Occupational Health and Wellness

At the end of this unit, students will be able to:

• Maintain correct posture while working
• Demonstrate handling of heavy and hazardous materials
• Maintain good health
• Define a health session

Resources to be Used

• Available objects such as a duster, pen, notebook and so on.
• A big box

Ask

• Ask the participants how long they generally sit or stand in one position at work.
• Ask the participants if they know the meaning of the term ‘Posture’.
• Ask the participants if they can tell the reasons that make manual handling of heavy and hazardous materials difficult.

Explain

• Introduce the topic of maintaining appropriate posture.
• Explain that posture means the way we hold our body when we sit, stand, lie, bend and so on.
• Explain the importance of maintaining a good posture while working and the consequences of bad posture habits.
• It is important to understand the role and responsibility of each one of the team members and the task being performed by that person.

Demonstrate

• Show the correct and incorrect postures while standing, sitting and lifting a load.

Explain

• Explain that while standing you should:
  o Stand with your feet apart and balance equally on both.
  o Pull the shoulders back.
  o Keep your knees straight.
Facilitator Guide

- Tuck your stomach in.
- Li your chin.
- Explain that while singing you should:
  - Sit with your back straight.
  - Place your buttocks at the back of the seat.
  - Place your feet flat on the floor with your knees bent at a 90-degree angle.
  - Pull the shoulders back.
- Li your chin.
- Explain that while lifting a load you should:
  - Place the load in front of you.
  - Bend the knees to a squat position.
  - Bring the load towards your chest.
  - Tighten the lumbar muscles to “lock” the back.
  - Li from the legs to a standing position.
- Do not:
  - Overreach or stand on toes.
  - Li from a twisted or a sideways position.
  - Li from a forward stooped or an imbalanced position.
- Explain that incorrect standing or singing in an incorrect posture for long periods results in:
  - Back pain
  - Neck pain
  - Degeneration of spine
  - Wear and tear of muscles

Introduce the topic of manual handling of heavy and hazardous materials.

- Explain that the risks associated with handling of heavy and hazardous materials can be reduced by:
  - Identifying the hazard
  - Assessing the risk
  - Selecting appropriate measures to control or reduce the risk
- Example:
  - Give an example that if they have to lift a huge box of wires then they should:
    - First, identify the hazard: they should check if it is heavy, if it is difficult to grasp and so on.
    - Second, they should assess the risk associated with the load: they should assess if it is strenuous to lift, if there is a danger of it falling over, if there is adequate space to lift it, if the floor is slippery or dirty and so on.
    - Third, they should select the appropriate measures to reduce the risk: they should lift it in such a way that it does not cause them any injury or strain, they should choose proper lifting aid and so on.
Explain that some injuries caused due to improper handling of heavy loads and hazardous materials are:

- Back ache, neck strain, wrist sprain, back sprain, shoulder pain and so on.
- Skin derma, respiratory problems, lung diseases and so on.

Explain that to prevent these injuries, they should:

- Use proper lifting aids such as jacks and trolleys.
- Use appropriate personal safety equipment such as safety boots, gloves, helmets and goggles.
- Work with a team when handling heavy loads.

Ask the participants what they understand by the term 'Health'.

Ask the participants if they can tell why it is important to maintain good health.

Explain that health refers to the general well-being of an individual.

Explain the importance of maintaining good health. Tell them that good health leads to:

- A safe and healthy work environment
- Increase in self-esteem and job satisfaction
- Improved ability to handle stress

Explain the importance of participating in health sessions such as yoga, physiotherapy and games conducted by the company.

Notes for Facilitator:

- Give the participants a brief overview of what all will be covered in the program.
- Start the discussion by involving them to join.
- While demonstrating the correct postures, make them practice them once.
- After asking them about handling manual loads, make four columns on the whiteboard: one each for load, task, workplace and individual. Do not write the column headings as yet.
- Write down the reasons for difficulty in handling heavy loads as cited by them on the whiteboard in the appropriate columns.
- Add any point missed by them.
- Now, give column headings as load, task, workplace and individual.
- Explain each factor one by one.
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1. Provide a situation in which you can practice your skills.

2. When you read the brief, try to imagine yourself in the situation described and behave in a way you feel to be natural—but be conscious of the fact that your role may differ from the approach you normally use.

3. You (and others) may benefit from the change in approach and behavior. For e.g., try to use the approach you feel to be most appropriate for the circumstances described in your brief.

4. The brief is just the starting point. It simply sets the scene and the one of session or activity. Try not to keep referring to the brief as this will affect the spontaneity of the meeting. Allow the role play to develop as you think it might in real life and change your approach in line with the behavior and responses of others involved.

5. If you find that you have too little information to answer questions or to describe what has happened in the situation, do feel free to add your own thoughts and ideas. Try to keep these within the frame of work you are taking and try to make your improvisations as realistic as possible.
At the end of this unit, participants will be able to:

1. Explain the meaning of health
2. List common health issues
3. Discuss personal strengths & value systems
4. Explain the meaning of hygiene
5. Discuss the purpose of Swachh Bharat Abhiyan
6. Explain the meaning of habit
7. Discuss ways to set up a safe work environment
8. Discuss critical safety habits to be followed by employees
9. Explain the importance of self-analysis
10. Discuss movement with the help of Maslow's Hierarchical Theory of Needs
11. Discuss the meaning of achievement movement
12. List the characteristics of an entrepreneur with achievement movement
13. List the different factors that may affect you
14. Discuss the role of attitude in self-analysis
15. Discuss how to maintain a positive attitude
16. List your strengths and weaknesses
17. Discuss the qualities of honest people
18. Describe the importance of honesty in entrepreneurs
19. Discuss the elements of a strong work ethic
20. Discuss how to foster a good work ethic
21. List the characteristics of highly creative people
22. List the characteristics of highly innovative people
23. Discuss the benefits of mangement
24. List the traits of effective managers
25. Describe effective management techniques
26. Discuss the importance of general management
27. Describe general management strategies
28. Discuss for management
29. Discuss the causes of stress
30. Discuss for stress management
UNIT 9.1.1: Health, Habits, Hygiene: What is Health?

Unit Objectives
At the end of this unit, the participants will be able to:

• Explain the meaning of health
• List common health issues
• Discuss possible preventive measures
• Explain the meaning of hygiene
• Discuss the purpose of Swachh Bharat Abhiyan
• Explain the meaning of habit

Resources to be Used

• Participant Handbook

Ask
• What do you understand by the term "Health?"
• According to you, who is a healthy person?

Say
• Discuss the meaning of health and a healthy person as given in the Participant Handbook.

Ask
• When did you visit the doctor last? Was it for you or for a family member?

Say
• Discuss the common health issues like common cold, allergies etc. Refer to the Participant Handbook.

Role Play
• Conduct a small skit with volunteers from the class. Consider one of the villagers has been appointed as a health representative of the village, what measurement will you as a health representative suggest to the common villagers to prevent common health issues discussed.

• You will need at least 4 volunteers (Narrator, Health Representative, Head of the Village, etc.)
• Explain the health concerns of the village to the Narator. The Narator will brief the class about the skit.

• Give the group of volunteers, 5 minutes to do the exercise.

• At the end of 5 minutes, ask the group to perform the skit to the class assuming them as the villageers.

• The class can ask questions to the group as a common village.

Summarize:

• Through this activity we got some pointers on how we preserve these common health issues.

Say:

• Let us now see how many of these health standards we follow in our daily life.

Activity:

Health Standard Checks from the Participant Handbook.

Ask:

• How many of you think that you are healthy? How many of you follow health habits?

Say:

• Let’s do an exercise to find out how healthy you are.

• Open your Participant Handbook section ‘Health, Habits, Hygiene: What is Health?’ and read thorough the health standards given.

• Tick the points which you think are true for you.

• Try to be as honest as possible as this is for your own learning.

Do:

• Ensure that all the participants have opened the right page in the Participant Handbook.

• Read aloud the points for the participants and explain if required.

• Give them 5 minutes to do the exercise.

• At the end of 5 minutes, ask the participants to check how many keys they got.
Facilitator Guide

\section*{Tell them that they need to follow all the points in this checklist regularly in order to remain healthy and fit.}

\section*{Ask Discuss:}
\begin{itemize}
  \item Is it necessary to practice personal hygiene every day? Why?
  \item How does a person feel when they do not practice good personal hygiene? Why?
  \item Can good personal hygiene help a person feel good about his/her self? How?
\end{itemize}

\section*{Say Discuss the meaning of hygiene as given in the Participant Handbook.}

\section*{Activity Health Standard Checklist: Personal hygiene}

\begin{itemize}
  \item Let's do an exercise to find out if we maintain good hygiene habits or not.
  \item Open the Participant Handbook and read through the Health Standard checklist given.
  \item Tick the points which you think are true for you.
  \item Try to be as honest as possible as this is for your own learning.
\end{itemize}

\section*{Do Ensure that all the participants have opened the right page in the Participant Handbook.}

\begin{itemize}
  \item Read aloud the points for the participants and explain if required.
  \item Give them 5 minutes to do the exercise.
  \item At the end of 5 minutes, ask the participants to check how many checks have they got.
  \item Ask them to calculate their score.
  \item Tell them what each score indicates by reading aloud what has been mentioned in the Participant Handbook.
\end{itemize}

\section*{Ask}
\begin{itemize}
  \item How many of you have heard about "Swachh Bharat Abhiyan"?
  \item Can you tell the class what it is about?
\end{itemize}
Tell them about good habits which can become a way of life.

Discuss some good habits which can become a way of life.

Tell them about good and bad habits and the reasons to make good habits a way of life.
Facilitator Guide

UNIT 9.1.2: Safety

Unit Objectives

At the end of this unit, participants will be able to:

• Discuss ways to set up a safe work environment
• Discuss critical safety habits to be followed by employees

Resources to be Used

• Participant Handbook
• Safety signs and symbols
• Safety equipment
• Blank papers
• Pens

Say:

• There are many common safety hazards present in most workplaces at one time or another. They include unsafe conditions that can cause injury, illness and death.

• Safety Hazards include:
  o Spills on floors or tripping hazards, such as blocked aisles or cords running across the floor.
  o Working from heights, including ladders, scaffolds, roofs, or any raised work area.
  o Unguarded machinery and moving machinery parts; guards removed or moving parts that a worker can accidentally touch.
  o Electrical hazards like cords, missing ground pins, improper wiring.
  o Machinery-related hazards (lockout/tag out, boiler safety, forklifts, etc.)

Team Activity

Safety Hazards

• There are two parts to this activity.
• First part will cover the potential safety hazards at workplace.
• Second part will cover a few safety signs, symbols and equipments at workplace.
• Use this format for the first part of the activity.

Pair 1: Hazard

What could happen?

How could it be corrected?
Ask

• How could you or your employees get hurt at work?

Say

• Let's understand it better with the help of an activity. You will be given a handout within your groups. You have to think about the possible hazards of your workplace, what damage these hazards could cause and about the correction.

Do

• Divide the class into five to six groups of four participants each.
• Put the format on the board for the activity.
• Give blank papers and pens to each group.
• The group is expected to think and discuss the potential safety hazards in the workplace.
• Ask the group to discuss and fill the format using the blank sheet.
• Give the groups 5 minutes for the activity.
• For the second part of the activity, show the class some pictures of safety signs, symbols and equipment.
• Now they will put down a few safety symbols, signs or equipment against the safety hazards identified.
• Give them 5 to 10 minutes to discuss and draw/note it.
• At the end of 10 minutes, the groups will present their answers to the class.

Say

• Now, let's discuss the answers with the class.
• All the groups will briefly present their answers.

Do

• Ask the audience to applaud for the group presentation.
• Ask de-brief questions to culminate the information from each group.
• Keep a check on me.
• Tell the group to wind up the discussion quickly if they go beyond the given time limit.
Facilitator Guide

Ask Debriefing
• What did you learn from the exercise?
• As an employee, is it important to ensure the safety of your employees from possible hazards? Why?

Summarize
• Ask the participants what they have learnt so far.
• Ask if they have any questions related to what they have talked about so far.
• Close the discussion by summarizing the steps to design a safe workplace and non-hazardous employees.
**Unit 9.1.3: Self-Analysis**

**Unit Objectives**

At the end of this unit, participants will be able to:

• Explain the importance of self-analysis
• Discuss movement with the help of Maslow's Hierarchy of Needs
• Discuss the meaning of achievement movement
• List the characteristics of entrepreneurs with achievement movement
• List the different factors that motivate you
• Discuss the role of attitude in self-analysis
• Discuss how to maintain a positive attitude
• List your strengths and weaknesses

**Resources to be Used**

• Participant Handbook
• Old newspapers
• Blank papers
• Pencils/pens

**Activity**

This is a paper pencil activity.

What are the three sentences that describe you the best?

What do you need to live happily?

What are your strengths and weaknesses?

Do

• Write the three questions on the board/flipchart before the session begins.
• Give plain papers and pencils/pens to each participant.
• Tell participants to write the answer for the three questions on the paper.
• Tell them the purpose of this activity is not to judge anyone but to understand more about self.
Facilitator Guide

• Discuss the concept of Self-Analysis and motivate with reference to Maslow’s Hierarchy of Needs as discussed in the Participant Handbook.

Team Activity

• Each group which will create a tower using the old newspaper.
• The task is to create a tower out of the newspapers.
• The group which will create the highest tower standing on its own will be considered the winning group.
• Groups can use as many newspapers as they want and in any way they want.

Ask
• What did the winning group do differently?
• If you were given a chance, how would you have made the tower differently?
• How did you feel while making the tower?
• Did you feel motivated?

Say
• Discuss the concept of achievement motivation and characteristics of thriving as discussed in the Participant Handbook.

Ask
• Is your attitude positive or negative?

Say
• Let me tell you a story:

It’s Little Things that Make a Big Difference.

There was a man taking a morning walk at the beach. He saw that along with the morning de came hundreds of starfish and when the de receded, they were left behind and with the morning sun rays, they would die. The de was fresh and the starfish were alive. The
A man took a few steps, picked one and threw it into the water. He did that repeatedly. Right behind him there was another person who couldn’t understand what this man was doing. He caught up with him and asked, “What are you doing? There are hundreds of starfish. How many can you help? What difference does it make?” This man did not reply, took two more steps, picked up another one, threw it into the water, and said, “It makes a difference to this one.” What difference are we making? Big or small, it doesn’t matter. If everyone made a small difference, we’d end up with a big difference, wouldn’t we?

**Activity**

**What Moves You?**

• This is an individual activity.

• It is an exercise given in the Participant Handbook.

• Ask the class to open their Participant Handbook and complete the exercise given in the second What Moves You?

• Ensure that the participants have opened the correct page for the activity.

• Give the class 5 minutes to complete the activity.

**Say**

• Discuss the concept of attitude and how to cultivate a positive attitude as discussed in the Participant Handbook.

**Summarize**

• Close the discussion by summarizing how self-analysis, knowledge of what moves you and your positive attitude can help in your business as well in life.
Facilitator Guide

UNIT 9.1.4: Hone\nsty & \nWork \nEthics

Unit Objectives
At the end of this unit, participants will be able to:
• Discuss the qualities of honest people
• Describe the importance of honesty in entrepreneurs
• Discuss the elements of a strong work ethic
• Discuss how to foster a good work ethic

Resources to be Used
• Participant Handbook

Ask
• What do you understand by honesty?
• Why is it important for entrepreneurs to be honest?
• Do you remember any incident where your honesty helped you in gaining confidence?
• Do you remember any incident where someone lost business due to dishonesty?

Say
• Discussed in the Participant Handbook.
• “Let’s understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyse the case scenario that has been given to you and then find an appropriate solution to the problem.
• Keep your discussion focused around the following:
  o What went wrong?
  o Who was at fault?
  o Whom did it impact—the customer or the businessman?
  o How would it impact the business immediately? What would be the long term impact?
  o What could be done?
  o What did you learn from the exercise?

Do
• Divide the class into four groups of maximum six participants depending on the batch size.
• Give one case study to each group.
• Instruct them to read the case carefully.
It's around 11 AM when Rajni hears a knock at the door. She goes to the door and opens it. It's Aakash, a regular customer. She greets him and asks him what he wants. Aakash tells her that he needs her help with a legal matter. She asks him to come inside and tell her more about it.

As they sit down, Aakash explains that he has been involved in a business dispute with another company. He has been accused of breach of contract and he is facing legal consequences. He wants Rajni to help him with the legal issues.

Rajni explains that she will need to see the details of the case to give him the best advice. She asks him to go over the contract and the evidence and bring it to her. She also asks him to bring any other relevant documents.

Aakash promises to do so and asks Rajni when she can see him again. Rajni tells him that she will need a few days to review the case and she will call him back with her decision.

Aakash thanks Rajni and leaves the shop.

Rajni is now faced with a new case. She knows that she needs to stay calm and focused. She starts by making a list of all the details she knows about the case. She also organizes a meeting with her team to discuss the case.

The team is given the case to analyze and discuss. They are asked to assign roles to the group and select a group leader. The group is expected to come up with a solution within 10 minutes.

At the end of 10 minutes, the group presents their solution. Rajni listens to their presentation and gives them feedback. She also explains how she would approach the case if she were in Aakash's shoes.

Rajni is confident that she can help Aakash with his legal issues. She looks forward to working with him and helping him get the outcome he deserves.
Facilitator Guide

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- Once the presentation is over, the class can ask their questions.

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- Keep a check on the audience's level of engagement.

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- Keep
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- Tell the group to wind up the discussion quickly if they go beyond the
time.

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There are some inspiring stories about people which I would like to share with you.

Let’s have a look at these stories.

What were the characteristics of these people?

What was so special about these people?

What do these stories tell us?

You must be aware of the ideas of highly creative people. Abdul Sulaiman hailed from Sikkim, India. He studied in India’s premier nuclear physics class and became the first Indian to achieve the code of nuclear scientist.

At the end of this unit, participants will be able to:

- List the characteristics of highly creative people.
- Understand the idea of a nuclear scientist.
- Appreciate the story of Abdul Sulaiman's achievements.
Ask yourself this question: why do you think this mechanism works? If you can, why can’t you?

Discussion: Respond to the question with real-life examples of how you have utilized or encountered this mechanism. Ask about the feasibility of using the same mechanism in other situations and the potential outcomes.

What was the main reason behind your selection of this mechanism? Why did you choose this mechanism?

Design: Explore various design parameters and their implications for the mechanism. Discuss the advantages and disadvantages of the design choices made.

Design variable:
- Temperature
- Pressure
- Material

What was the main design variable that you considered in this project? Why did you choose it?

Design to reality:
- Real-world implementation
- Challenges encountered
- Future improvements

Discuss the design process from concept to reality. What were the challenges you faced during the realization of the mechanism? What improvements can be made in future iterations?
Instruct the participants that this is group work.

Divide the class into small groups of 4 or 6 depending on the batch size.

Give each group a chart paper.

Tell the participants they have to write a few lines about any one famous entrepreneur.

Give the participants 10 minutes to discuss and write.

Keep a check on them. Tell the group to wind up quickly if they go beyond the given time limit.

Ask each group to read out what they have written.

Ask them to share some experiences about these people with the class.

Summarize the unit by asking participants if they know of some people who are highly creative and innovative in their approach.

Ask them to share some experiences about these people with the class.
I would love to start my dream business; but, I just do not have the time. I had so much to do, so I could not deliver that or these assignments. I want to go for a walk and exercise, but I just do not have the time. He has so many commitments and he is stressed about the same. His boss is so much more demanding and he has so much more work. He has so much to do and he is not accomplishing anything. He looks frustrated and he is tired of these demands. He is not looking forward to going back to work. He needs to get organized and start managing his time.
Ask
• Does this happen with you too?
• Do you find it difficult to prioritize your work?
• Are you able to manage your time effectively?

Activity
• Conduct a group discussion based on the above examples.
• Direct the discussion on how to prioritize work and manage your time effectively.

Say
• Time management is not only about how hard you work but also about how smart you work.
• Discuss “What is Time Management” with the participants as given in the Participant Handbook.

Ask
• Why is it important to manage your time? How does it help?
• What happens when you don’t manage your time effectively?
• Do you find it difficult to prioritize your work?

Say
• Discuss the benefits of time management given in the Participant Handbook.
• Let’s learn effectively with the help of an activity.

Activity
• This activity has two parts:
  Part 1 To Do List
  • You have to make a to-do list.
  • List all of the activities/tasks that you have to do.
  • Try to include everything that takes up your time, however unimportant it may be.
  • If they are large tasks, break them into smaller steps, and write this down with the larger task.
  • You can make one list for all your tasks or have separate to-do lists for personal and professional tasks.
Facilitator Guide

You have two marks as shown on the board here.

This grid has four boxes. As you can see, each box has a different heading.

At the heart of the urgent-important grid, are these two questions:

- Is this task important?
- Is this task urgent?

Now, you have two think about each activity you have written in your to-do list and put it into one of the four categories.

What do these categories depict?

Category 1: Urgent/Important
This category is for the highest priority tasks. They need to get done now.

Category 2: Not Urgent/Important
This is where you want to spend most of your time. This category allows you to work on something important and have the time to do it properly. This will help you produce high quality work in an efficient manner. The tasks in this category are probably the most neglected ones, but also the most crucial ones for success. The tasks in this category can include strategic thinking, deciding on goals or general direction and planning — all vital parts of running a successful business.

Category 3: Urgent/Not Important
This is where you are busy but not productive. These tasks are often mistaken to be important, when they're most often busy work. Urgent but not important tasks are things that prevent you from achieving your goals. However, some may be activities that other people want you to do.

Category 4: Not Important and Not Urgent
This category doesn't really include tasks, but rather habits that provide comfort, and a refuge from being disciplined and rigorous with your time management. Some may be activities that other people want you to do. These might include unplanned leisure activities as well.
<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
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<tbody>
<tr>
<td>Planning</td>
<td>Working towards goals</td>
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<td>Building relationship</td>
<td>Personal commitments</td>
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<td>Internet surfing</td>
<td>Social media</td>
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<td>Watching TV</td>
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<td>Interruptions</td>
<td>Phone calls/E-mails</td>
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<td>Other people's minor</td>
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<td>Urgent/Not Important</td>
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<td>Meetings</td>
<td>Last minute demands</td>
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<td>Project deadlines</td>
<td>Crisis</td>
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Do

• Put down the formats for the to-do list and the urgent/important grid on the board.

• Instruct the participants to prepare their to-do list first.

• Give the participants 10 minutes to prepare the list.

• Once done, instruct them to divide the tasks into the four categories.

• Explain the four categories to the participants giving examples specific to their context.

• As you explain the categories fill the grid with the type of tasks.

• Give the participants 40 minutes to fill the grid.

• Then explain how to balance the tasks between the four categories.

• Keep a check on me. Tell the group to wind up quickly if they go beyond the given time limit.

Activity Description:

How can we balance tasks between the four categories? How to manage their through this grid?

Category 1: Urgent/Important to Try to keep as few tasks as possible here, with the aim to eliminate. If you spend too much of your time in this category, you are working solely as a trouble shooter, and never finding me to work on longer-term plans.

Category 2: Not Urgent/Important to Plan these tasks carefully and efficiently as they are most crucial ones for success. If necessary, also plan where you will do these tasks, so that you’re free from interruptions. Include strategic thinking, deciding on goals or general direction and planning in your planning process.

Category 3: Urgent/Not Important to Ask yourself whether you can reschedule or delegate them. A common source of such activities is other people. Sometimes it’s appropriate to say “no” to people politely, or to encourage them to solve the problem themselves.

Category 4: No Important and Not Urgent You also want to minimize the tasks that you have in this category. These activities are just a distraction – avoid them if possible. You can simply ignore or cancel many of them. Politely say “no” to work assigned by others, if you can, and explain why you cannot do it. Schedule your leisure activities carefully so that they don’t have an impact on other important tasks.

Discuss the traits of effective management techniques as given in the Participant Handbook.
Facilitator Guide

• Discuss the traits of effective management and effective management techniques as given in the Participant Handbook.

Notes for Facilitator

• Here is a short story. You can conclude the session narrating the story. To make it more interesting you can perform the demonstration and discuss the short story.

One day an expert in management was speaking to a group of students. As he stood in front of the group, he pulled out a large wide-mouthed glass jar and set it on the table in front of him. Then he took out a bag of about a dozen rocks and placed them, one at a time, into the jar. When the jar was filled to the top and no more rocks would fit inside, he asked, “Is this jar full?” Everyone in the class said, “Yes.” Then he said, “Really?”

He reached under the table and pulled out a bucket of gravel (small stones). He dumped some gravel in and shook the jar causing pieces of gravel to work themselves down into the space between the rocks. Then he asked the group once more, “Is the jar full?” By this time, the class began to understand. “Probably not,” one of them answered. “Good!” he replied.

He reached under the table and brought out a bucket of sand. He started dumping the sand in the jar and it went into all of the spaces left between the rocks and the gravel. Once more he asked the question, “Is this jar full?” No!” the class shouted. Once again he said, “Good.” Then he grabbed a jug of water and began to pour it in until the jar was filled to the brim.

Then he looked at the class and asked, “What is the point of this illustration?” One student raised his hand and said, “No matter how full your schedule is, if you try really hard you can always fit some more things in it!” “No,” the speaker replied, “that’s not the point. The truth this illustration teaches us is: If you don’t put the big rocks in first, you’ll never get them in at all.” What are the ‘big rocks’ in your life? Your children; your loved ones; your education; your dreams; a worthy cause; teaching or mentoring others; doing things that you love; me for yourself; your health; your mate (or significant other). Remember to put these BIG ROCKS in first or you’ll never get them in at all. If you sweat about the little stuff (the gravel, sand, and water) then you’ll fill your life with little things you worry about that don’t really matter, and you’ll never have the me you need to spend on the big, important stuff (the big rocks).

• End the story with these lines…

So, tonight, or in the morning, when you are reflecting on this short story, ask yourself this question: What are the ‘big rocks’ in my life? Then, put those in your jar first.
At the end of this unit, participants will be able to:

• Discuss the importance of generator management

• Describe generator management strategies

• Discuss professional ethics in the context of generator management

Resources to be Used

• Participant Handbook

• Ask:
  - What is a generator? Is it good or bad?
  - Is a generator normal or abnormal behavior? How can a generator harm you?
  - Why is it important for engineers to manage their generator as discussed in the Participant Handbook.

• Let us do a small activity. This is an individual activity.

• Think of the incidents and situations that generated you and hurt you.

Do:

• Instruct them to note down these situations under different categories (as given in the Activity).

• Give the class 3-5 minutes to think and note down their answers.

• At the end of 5 minutes, ask some participants to volunteer and present their answers.

• They can also share these situations with their fellow participants if they do not wish to share it with the entire class.
Facilitator Guide

Ask

• Do you ever get angry?
• What are the things that make you angry?
• Do you remember any incident where your anger management helped you in maintaining healthy relationship?
• Do you remember any incident where someone lost business/friend/relationship due to temper (anger)?

Say

• There are a few strategies which can help in controlling your anger.
• Let’s do an activity to understand the anger management process better.
• This is an individual activity.
• Think of the incidents/situations which trigger your anger (the cause).
• Then think what happened as a result of your anger (the effect).
• You need to come up with some techniques to manage your anger.

Do

• Give the class the anger triggers (the cause) as listed in the activity.
• Put down the activity format (Anger Triggers, Result of your Anger, Anger Management Techniques) on the board and instruct the class to write the answers under different categories.
• Give the class 3-5 minutes to think and note down their answers.
• At the end of 5 minutes, ask the participants who wish to volunteer and present their answers.

Activity

Trigger points and Anger Management Techniques Activity

Anger Triggers

• Someone says you did something wrong.
• You wanted something you can’t have now.
• You get angry about doing something you shouldn’t have been doing.
• You are accused of doing something you didn’t do.
• You are told that you can’t do something.

Anger Management Techniques

1. \( A_{12} \times A_8 \times \sigma (5) \)
2. \( A_8 \times (e_8 \times \sigma A_3) \times A_8 \times A_3 (5) \)
3. \( A_9 \times (e_9 \times \sigma A_3) \times A_9 \times A_3 (5) \)
4. \( A_{10} \times (e_{10} \times \sigma A_3) \times A_{10} \times A_3 (5) \)
5. \( A_{11} \times (e_{11} \times \sigma A_3) \times A_{11} \times A_3 (5) \)
6. \( A_0 \times (e_0 \times \sigma A_3) \times A_0 \times A_3 (5) \)
7. \( A_4 \times (e_4 \times \sigma A_3) \times A_4 \times A_3 (5) \)
8. \( A_{12} \times (e_{12} \times \sigma A_3) \times A_{12} \times A_3 (5) \)
9. \( A_{13} \times (e_{13} \times \sigma A_3) \times A_{13} \times A_3 (5) \)
10. \( A_{14} \times (e_{14} \times \sigma A_3) \times A_{14} \times A_3 (5) \)
11. \( A_{15} \times (e_{15} \times \sigma A_3) \times A_{15} \times A_3 (5) \)
12. \( A_{16} \times (e_{16} \times \sigma A_3) \times A_{16} \times A_3 (5) \)
13. \( A_{17} \times (e_{17} \times \sigma A_3) \times A_{17} \times A_3 (5) \)
14. \( A_{18} \times (e_{18} \times \sigma A_3) \times A_{18} \times A_3 (5) \)
15. \( A_{19} \times (e_{19} \times \sigma A_3) \times A_{19} \times A_3 (5) \)
16. \( A_{20} \times (e_{20} \times \sigma A_3) \times A_{20} \times A_3 (5) \)
17. \( A_{21} \times (e_{21} \times \sigma A_3) \times A_{21} \times A_3 (5) \)
Someone doesn’t agree with you.
Someone doesn’t do what you tell him to do.
Someone unexpected happens that messes up your schedule.

Result of your anger:

Write the techniques that you use to manage your anger:

• Now, let’s discuss the problems and solution with all.
• The individual will first briefly describe trigger points to the class.
• Then discuss the result of the anger. Other participants are requested to remain quiet while one is making the presentation.
• Post presentation, other participants may ask questions.
• Congratulate each individual for sharing their points.
• Ask the audience to applaud for them.
• Ask de-brief questions after the presentation to the class.
• Keep a check on the time. Ask the participants to wind up the activity quickly if they go beyond the given time limit.
Facilitator Guide

Ask questions:
• In the situation described by the presenter, who was at fault?
• How could you have handled this situation alternatively?

Summarize:
• Close the discussion by summarizing the strategies and pros of anger management for entrepreneurs.
• Ask the participants what have they learnt from this exercise/ activity.
• Ask if they have any questions related to what they have talked about so far.

Notes for Facilitator:
• Encourage the participants to share information about them while presenting the situations to the class.
• Keep the format of the activity prepared in a chart paper so that it can be displayed during the session.
Unit Objectives
At the end of this unit, participants will be able to:

• Discuss the causes of stress
• Discuss the symptoms of stress
• Discuss stress management

Resources to be Used
• Participant Handbook

Say
• You’ve probably heard people say, “I’m really stressed out” or “This is making me feel tiny.”

Ask
• What do you understand by stress?
• What gives you stress?
• How do you feel when you are stressed or what are the symptoms of stress?
• How can stress harm you?
• Why is it important for employees to manage stress?

Say
• When we feel overloaded or unsure of our ability to deal with certain challenges, we feel stressed.

Discuss about stress, causes of stress, and symptoms of stress as discussed in the Participant Handbook.

Let’s understand the causes of stress and how to deal with them with the help of some case scenarios.
• You will be given some cases.
• You have to analyse the case scenario and then find an appropriate solution to the problem.
• This will be a group activity.

Divide the class into four groups of 5-6 participants (depending on the batch size).
Assign one case scenario to each group.
Instruct them to read the case carefully.
The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
Explain their discussion should result in getting answers for the following questions:
  o What was/were the cause(s) of stress?
  o Was the stress avoidable or manageable under the given circumstances?
  o If yes, how do you think the stress could be avoided (managed)?
  o If no, then why?

Give the class 10-12 minutes to discuss the case and note down their solutions.
At the end of 12 minutes, the team should present their case solution to the larger group.
Ask the group to select a group leader for their group.
The group leader to discuss and assign roles to the group members for the presentation.

Team Activity
Case Study Analysis

Scenario 1
Akash's alarm doesn't go off and he gets late going out of the house. He hits traffic and ends up 15 minutes late to work, which his boss notices. He gets to his desk and finds he has to complete 2 reports in next one hour. Just when he is about to begin work, a message pops up "Telecon with the client begins in 10 minutes. Please be in the conference room in 5 minutes." He is not prepared for the call. He is stressed. He does not want to speak to his boss about this. He is stressed, feeling uncomfortable and sick. Not in a position to end the call or finish the reports on me.

Scenario 2
While paying his overdue bills, Rahul realised that it's the middle of the month and he has only Rs 500 left in his account. He has already asked all of his friends, and family for loans, which he hasn't paid back yet. He is still ekonomising over the issue when his phone rings. His sister's birthday is due next week and she has seen a beautiful dress which she wants to buy but cannot tell the parents as it is a bit expensive. She wishes if Rahul could buy the dress for her.
Arpit is a young entrepreneur who is wondering if he has what it takes to fulfill the requirement of his new role, or the new experiences he's likely to face. He has not been able to get a good deal in his family business, so he has decided to take risks. Arpit has always been into a job. Although Arpit has very few financial liabilities, it wasn't an issue when nobody ever argued about money. Arpit is nervous about whether he can manage the consequences and the challenges of stress. Sheela has been in trouble because she has been unable to pay her bills. Her customers have wanted to know the causes of stress. Neelam has been in trouble because she has been unable to pay her bills. Arpit has been in trouble because he has been unable to pay his bills. Rahul has been in trouble because he has been unable to pay his bills. She has been in trouble because she has been unable to pay her bills. Now, let's discuss the proposed solutions to the group. The group will first briefly describe the case to the class. Now, let's discuss the proposed solutions. If no, then why? If yes, how do you think that the stress was avoidable or manageable under the given circumstances? What was the cause of stress?
Facilitator Guide

- Then discuss the issue identified and the proposed solution.
- Post presentation, the other group may ask questions to the group at the has presented.

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Ask detailed questions to cull out the information from each group.
- Keep a check on time. Tell participants to wind up the discussion quickly if they go beyond the given time limit.

- While it is common and normal to feel some tension, this feeling nervous and tensed can interfere with your thinking process and can have a negative impact on your performance.
- Stress can deplete the most vibrant of souls. It can have a negative effect on every aspect of a person's life including their health, emotional well-being, relationships, and career. However, one needs to understand the causes and types of stress before looking for ways to manage it.

**Scenario 1**
The cause of stress was lack of time management and the habit of procrastinating. If Akash would have managed his time well, planned alternately to get up on time, finished prior tasks as soon as possible, then he wouldn't have faced stress.

**Scenario 2**
The cause of stress was lack of financial planning. Rahul should have planned his financial resources well in advance and saved some money for the rainy day. Also, differentiating between needs and wants and keeping a check on non-essential expenditure would have saved Rahul from this situation.

**Scenario 3**
Some times, stress is caused due to external factors instead of internal ones. In this case, the stress was unavoidable because we have no control over this customer care system. Every time, you will get in touch with a new executive and will have to explain all over again. This might cause stress but despite being frustrated and angry there is little that we can do about it. All Sheela could do was to find ways to calm herself down through some breathing exercises and meditation, reading some good book or listening to music and then start afresh.
A.1 A three-year-old girl, Rakesh, was asked to help in a rescue operation during an earthquake. He had to climb through the debris to reach his grandmother, who was stuck under the rubble.

B.1 The building was under construction, and the earthquake caused a collapse, trapping people inside. Rakesh realized that the rescue operation was urgent and that every second counted.

C.1 Rakesh, despite his young age, showed remarkable strength and determination. He climbed through the debris, carrying his grandmother on his back, and eventually reached safety.

D.1 This scenario is a good example of stress that can be overcome with courage and determination. Rakesh's actions highlight the importance of staying calm under pressure and the power of personal resilience in critical situations.

E.1 During the exercise, participants were asked to reflect on the scenario and discuss the following questions:

- What was the result of the stress? Was it avoided or manageable under the given circumstances?
- What kind of stress was Rakesh unprepared for? Did he have the necessary skills to handle it?
- How did Rakesh handle the stress? What resources and support did he use to overcome it?

F.1 The scenario was effective in demonstrating the importance of stress management and the potential for resilience in the face of adversity. It also served as a reminder of the critical role emergency services play in rescuing people in such situations.

G.1 By reflecting on the scenario, participants gained insights into their ability to manage stress and the importance of preparedness in emergencies. It encouraged them to learn more about stress management techniques and to apply them in real-life situations.
Facilitator Guide
Notes for Facilitation

• Keep printed copies of the activities/scenarios ready for the session.
• Put down the debrief questions on a flip chart so that it can be displayed in the class during the activity.
• Encourage participation and make the discussions interactive.
Wireman Control Panel

UNIT 9.2: Digital Literacy: A Recap

Key Learning Outcomes

At the end of this unit, participants will be able to:

1. Identify the basic parts of a computer
2. Identify the basic parts of a keyboard
3. Recall basic computer terminology
4. Recall the functions of basic computer keys
5. Discuss the main applications of MS Office
6. Discuss the benefits of Microsoft Outlook
7. Identify different types of e-commerce
8. List the benefits of e-commerce for retailers and customers
9. Discuss Digital India campaign will help boost e-commerce in India
10. Describe how you will sell a product or service on an e-commerce platform
UNIT 9.2.1: Computer and Internet Basics: Basic Parts of a Computer

Objectives
At the end of this unit, participants will be able to:
• Identify the basic parts of a computer
• Identify the basic parts of a keyboard
• Recall basic computer terminology
• Recall the functions of basic computer keys

Resources to be Used
• Participant Handbook
• Computer Systems with the required applications

Say
• Let's take a quick recap of the basic computer parts.
• Discuss 'Basic Parts of Computer' and 'Basic Parts of a Keyboard' with the class given in the Participant Handbook.

Explain
• Explain all the parts of the computer and the keyboard by demonstrating on the real system.

Ask
• Do you know about internet?
• Have you ever used internet?
• Why do you think internet is useful?
• What was the last task you performed on internet?

Say
• Let's look at some basic internet terms.
• Discuss 'Basic Internet Terms' with the participants as given in the Participant Handbook.

Summarize
• Ask the participants what they have learnt from this exercise/activity.
• Ask if they have any questions related to what they have talked about so far.
Practical Session

- Ask the participants to assemble in the computer lab.
- Give hands-on practical exercises.
- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.
- Ensure the participants complete the practical exercises assigned.
**Unit Objective**

At the end of this unit, participants will be able to:

- Discuss the main applications of MS Office
- Discuss the benefits of Microsoft Outlook

**Resources to be Used**

- Participant Handbook
- Computer Systems with the required applications

**Ask**

- What is the most frequent activity that you do on the computer?
- Do you know how to make presentations on the computer?

**Say**

- Give a brief introduction of MS Office as given in the Participant Handbook.
- Discuss the most popular office products. Explain in brief their applications, benefits and working.

**Micr...**

- Microsoft Word is a word processing program that allows for the creation of documents. The program is equipped with templates for quick formatting. There are also features that allow you to add graphics, tables, etc.

**Micr...**

- Microsoft Excel is a tool for accounting and managing large sets of data. It can also simplify analyzing data. It is also used to create charts based on data, and perform complex calculations. A cell is an individual data box which will have a corresponding column and row heading. This gives the cell a name, referred to as the cell reference. There can be multiple pages in each workbook. Each page, or sheet, is called a worksheet. When you open a new Excel file, it automatically starts with three worksheets, but you can add more.

**Explain**

- Explain the working and frequently used features of Office on a real system.

**Ask**

- What do you know about e-mails?
- Do you have an email id?
- How often do you check your e-mails?
Communication is vital for every business. The fastest and the safest way to communicate these days are through emails. MS Outlook helps to manage your emails in a better way and also offers a host of other benefits.

Discuss "Why Choose Microsoft Outlook?" with the participants as given in the Participant Handbook.

Do

• Ask the participants to assemble in the computer lab.
• Explain the working of Outlook on a real system.
• Demonstrate how to create email id.
• Demonstrate how to write new mails, send mails.
• Demonstrate how to use MS Office application to create a file and send it as an attachment in an email.
• Demonstrate how to use other MS Office applications.

Practice

• Give some hands-on practice exercises
• Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
• Explain the purpose and duration of the activity.

Summarize

• Ask the participants what they have learnt from this exercise/ activity.
• Ask if they have
UNIT 9.2.3: E-Commerce

Unit Objective
At the end of this unit, participants will be able to:

• Identify different types of e-commerce
• List the benefits of e-commerce for retailers and customers
• Discuss how the Digital India campaign will help boost e-commerce in India
• Describe how you will sell a product or service on an e-commerce platform

Resources to be Used
• Computer systems with internet connection
• Participant Handbook

Ask
• How many of you have done shopping online?
• Can you name at least five shopping websites?
• What is the product that you most frequently buy online?
• Why do you do shopping online instead of going to the market?

Say
• Give a brief introduction of "What is E-commerce". Refer to the Participant Handbook.

E-commerce emerged in the early 1990s, and its use has increased at a rapid rate. Today, many companies sell their products online. Everything from food, clothes, entertainment, furniture and many other items can be purchased online.

Ask
• What other types of transactions have you performed on the internet other than buying products?

Say
• Give examples of e-commerce activities from Participant Handbook.

Team Activity: E-commerce Examples
• Instruct the participants to list some of the payment gateways that they have used for e-commerce activities.
Give them 5 minutes to make this list.

Discuss payment gateways and transactions through payment gateways.

Conclude the discussion by mentioning how important e-commerce has become in our day-to-day transactions.

E-commerce activities can be classified based on the types of participants in the transaction.

Discuss "Types of E-commerce" from the Participant Handbook.

Discuss all types of E-commerce by giving examples and names of some popular websites which use them.

Make the discussion interactive by asking the class to share some popular e-commerce sites of each type.

E-commerce activities bring a host of benefits for both, retailers and customers.

Discuss benefits of E-commerce from the Participant Handbook.

The majority of the population that uses e-commerce activities lives in er1 and er2 countries. To encourage the use of digital money in er-3 and 4 areas, PM Mr. Modi launched the "Digital India Campaign".

Discuss "Digital India Campaign" from the Participant Handbook.

By Digital India project the government will deliver services via mobile connectivity and in doing so, is expected to bring the internet and broadband to remote corners of the country. This connectivity will in turn enhance e-commerce activities also. Furthermore, the Indian Government is also modernizing India Post and aims to develop it as a distribution channel for e-commerce related services.

Now let us discuss how to sell a product using E-commerce.

Every product has to be sold on a platform on the internet. Think of it as a shop that you have to sell your product. Now this shop can be your own or shared or rented. If the shop is your own or rented there will be only your products in that shop. If the shop is shared, there will be products of multiple sellers in that shop. A common example is a departmental store which has products from multiple brands in the shop.
Similarly, in Ec-commerce the shop is the website where your products are displayed. If it is your own website it will exclusively show your products. In this case the cost that you will incur will be:

- Developing the website
- Hosting the website
- Maintenance of the website

If you rent a website it will also showcase your own products but the development, hosting and maintenance parts goes to the owner. This saves me and the cost to manage these activities.

Smaller companies usually go for renting a website and the bigger ones develop their own website.

The concept of shared platforms has become very popular in recent times. In this platform, the sellers have to register and then they can sell their goods on a common platform. Among the most popular of these are Amazon, Myntra, Flipkart, etc.

Role Play

Tell the participants to choose a product or service that they want to sell online.

Tell them to write a brief note explaining how they will use existing e-commerce platforms, or create a new e-commerce platform to sell their product or service.

Ask

- How much money are you carrying in your wallet?
- Do you have a credit/debit card?
- How do you make payments while doing online shopping?

Say

- Demonstration has made carrying cash in the wallet very difficult. People either shop through cards or some other form of digital money.
- So, what do you think is digital money?
- In this form, the money is both paid and received digitally. There is no hard cash involved. It is an instant and convenient way to make payments.
- There are various types of digital payments. Let us discuss some of them in brief here.
- The first one is the most commonly used system i.e. the cards. Debit card, credit card, prepaid card, all fall under this category.
- Then is the e-wallet or the mobile wallet. This has become the most used form of digital money after demonetization. Examples are Paytm, SBI Buddy, Freecharge, etc.
- Many other forms of digital money are also coming up in market like mobile apps, Aadhar card based payment, etc.
Do

• Demonstrate how to make and receive payments through digital models like PayPal and Statue bank buddy.

Ask

• Why do you think people started using digital money instead of hard cash? Is demonstration the only reason?

Say

• Digital money gives a lot of advantages over the conventional hard cash. Some of them are:
  - Digital payments are easy and convenient. You do not need to take loads of cash with you, a mobile phone or a card will suffice.
  - With digital payment modes, you can pay from anywhere anytime.
  - Digital payments have less risk.

Summarize

• Ask the participants what they have learnt from this exercise/ activity.
• Ask if they have any questions related to what they have talked about so far.
• Close the discussion by summarizing the importance of e-commerce and digital money.
Key Learning Outcomes

At the end of this unit, participants will be able to:

1. Discuss the importance of saving money
2. Discuss the benefits of saving money
3. Discuss the main types of bank accounts
4. Describe the process of opening a bank account
5. Differentiate between fixed and variable costs
6. Describe the main types of investment options
7. Describe the different types of insurance products
8. Describe the different types of taxes
9. Discuss the uses of online banking
10. Discuss the main types of electronic funds transfer
UNIT 9.3.1: PERSONAL FINANCE – HOW TO SAVE?

UNIT OBJECTIVES
At the end of this unit, participants will be able to:

• Discuss the importance of saving money
• Discuss the benefits of saving money

RESOURCES TO BE USED
• Participant Handbook

ASK
• How many of you save money?
• Why do you feel the need to save it?
• Do you plan your savings?
• Where do you keep the money you save?
• How do you use the money that you have saved?

EXAMPLE
Let's look at these two examples:

EXAMPLE 1:
Suhani works in a good company and earns Rs.30,000 per month. She always saves Rs.5000 per month and keeps it aside as a personal saving. She keeps the money at home and has saved quite a lot. One day her mother has a medical emergency and has to be taken to the hospital. Her family is worried about the amount they have to spend for the treatment. It will cost them at least Rs.40,000. Suhani says, “Tell your family not to worry and that I have about Rs.50,000, which I have saved over the months.”

EXAMPLE 2:
Jasmeet works in the same company and earns the same as Suhani. She is very fond of shopping and spends most of her money on buying new clothes. At the end of the month, she is always asking her father for money as her pay is finished.

ASK
• Who do you identify with – Suhani or Jasmeet?
• How do you think Suhani manages to save money which Jasmeet is unable to do?
• We should always set aside some and save some money from our monthly pay. The future is unpredictable. Saving money not only gives you a sense of financial security but it can be used in case of emergencies.

• Discuss “Importance of Saving” with the participants as given in the Participant Handbook.

• What are the benefits of saving money?
• What does being financially independent mean to you?

• Discuss “Benefits of Saving” with the participants as given in the Participant Handbook.

• Now let us continue with Suhani’s story. Suhani has told her family not to worry and that she has about 50,000, which she has saved over the months. The family is happy about Suhani’s decision of saving money, which will be of great help for them now. Suhani is going to the hospital today to pay the first installment for the treatment. Suddenly finds only 35,000 in her cash box when she counts and does not remember using it. She has not kept any record and now she is upsets.

• Was it a good decision by Suhani to save a part of her earnings every month?
• Was it a wise decision to keep all her savings as cash in a cash box?
• Could she have managed to save money in a better and more efficient manner?
• Do you want to learn how to save money and use it efficiently?

• Let’s learn personal saving with the help of a group activity.
Team Activity

Personal Finance - Why to save money

• This activity has two parts:

**PART 1**

**SAY MONEY**

• You are earning Rs. 30,000/- per month. You have recently changed your job and have to move to a metropolitan city. You are now living as a paying guest paying Rs. 8,000/- per month. Your other estimated expenditures like travel, food, recreation would be around Rs. 17,000 per month.

• Make a list of different ways to save money.

**PART 2**

**HOW WILL YOU USE THE MONEY?**

• After a year how much have you been able to save?

• How will you use the money that you have saved?

Do

• Divide the class into groups of four.

• Instruct the participants to think and prepare a list of the various ways they can save money.

• Give the participants 10 minutes to prepare the list.

• Once done, instruct them to think of how they could use the money they have saved.

• Give the participants 10 minutes to prepare the list.

• Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Activity Debrief

• What were the different ways you could save money?

• How much money were you able to save?

• How will you use the money you have saved in one year?

Say

• Discuss the importance of personal finance and why it is important to save money.

Summarize

• You can summarize the session by discussing:

  • The importance of saving money.
  • Why to save money.
  • How the money saved can be used for different purposes.
UNIT 9.3.2: Types of Bank Accounts, Opening a Bank Account

Unit Objective
At the end of this unit, participants will be able to:

- Discuss the main types of bank accounts
- Describe the process of opening a bank account

Resources to be Used
- Account opening sample forms
- Participant Handbook

Ask
- How many of you save money?
- Where do you keep the money you save?
- How many of you have a bank account?
- What type of account do you have?

Example
Let's look at the given example:
Reena is in the third year of college but in the evening, she gives tuitions for children living in her colony. She earns 15,000/- per month. As her students stay in different parts of the city, she has to walk a lot. To save time, she decides to buy a second hand scooter for herself. But she has to save money for it. Her classmate advises her to open a recurring deposit account in the bank. She goes to the bank close to her home. The personal manager gives her some forms to fill. She is confused as she has never done this before. Her elder sister has an account in the same bank. She asks for help from her sister. She goes to the bank the next day with her sister. The personal banker gives her a list of documents that she will need to submit with the form for opening an account. The banker advises her to open a 6 months recurring deposit.
Before opening a bank account, you need to know the types of accounts we have in India.

Discuss "Types of Bank Accounts" with the participants as given in the Participant Handbook.

Ask

Can anyone tell at a glance the different types of accounts?

Let's learn about the different types of accounts through an activity.

Team Activity

Divide the class in four groups.

Label the groups as savings account, current account, recurring account and fixed deposit.

On a chart paper, ask them to write the key points of their account.

Activity Details

Ask each group to present the key points of their account.

Now that you know about the four different types of accounts, let's learn how to open a bank account.

Discuss "Opening a Bank Account" with the participants as given in the Participant Handbook.

Discuss "Tips" that the participants should keep in mind while opening a bank account as given in the Participant Handbook.

Ask

What are the main documents required for opening a bank account?

What are some important points to ask the bank personnel while opening an account?
Team Activity

Opening a Bank Account

- This activity is done in groups.
- Divide the class into groups of four or six.

**PART 1** FILLING A BANK ACCOUNT

- You have to fill a bank account opening form.
- You can refer to the section "Opening a Bank Account" of your Handbook for reference.
- List all the steps that you will be required to fill in the form.
- List the documents that you need for filling the form.
- Now fill in the form.

Activity Description

- How did you design the form?
- What all details did you fill in the form?
- What were your KYC documents?
- How would this activity help you in future?

Do

- Instruct the participants to read the section "Opening a Bank Account" of the Participant Handbook.
- Give each group one sample account opening form.
- Give the participants 5 minutes to read the form.
- Give them 15 minutes to fill it.
- Assist them by explaining each category and how to fill it.
- Keep a check on me.
- Tell the group to wind up quickly if they go beyond the given time limit.

Summary

- You can summarise the unit through a role play.
- A person wanting to open an account in the bank.
- What is the procedure that he will go through?
- Discuss the key points of different types of bank accounts.
- How to select the type of account.
- How to fill the account opening form.
A sample account opening form is given in the following page for reference. Use it for the activity in the class.

###XXX Bank SAVING BANK ACCOUNT OPENING FORM

<table>
<thead>
<tr>
<th>Account No.</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Name of the Branch**

Village/Town

Sub District / Block

District

State

SSA Code / Ward No.

Village Code / Town Code

###Applicant Details:

**Full Name**

Mr./Mrs./Miss

**Middle Name**

**Last Name**

**Marital Status**

**Name of Spouse/Father**

**Address**

**Pin Code**

**Tel No.**

**Mobile No.**

**Date of Birth**

**Aadhaar No.**

**PAN No.**

**MNR EGA Job Card No.**

**Occupation/Profession**

**Annual Income**

**No. of Dependents**
<table>
<thead>
<tr>
<th>Detail of Assets</th>
<th>Owning House Y/N</th>
<th>Owning Farm Y/N</th>
<th>No. of Animals</th>
<th>Any other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Bank A/c. of family members / household</td>
<td>Y/N No. of A/cs.</td>
<td>If yes, No. of A/cs.</td>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Kisan Credit Card</td>
<td>Whether Eligible Y/N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I request you to issue me a Rupay Card.

I also understand that I am eligible for an Overdraft after satisfactory operation of my account after 6 months of opening my account for meeting my emergency/family needs subject to the condition that only one member from the household will be eligible for overdraft facility. I shall abide by the terms and conditions stipulated by the Bank in this regard.

Declaration:
I hereby apply for opening of a Bank Account. I declare that the information provided by me in this application form is true and correct. The terms and conditions applicable have been read over and explained to me and have understood the same. I shall abide by all the terms and conditions as may be in force from time to time. I declare that I have not availed any Overdraft or Credit facility from any other bank.

Place: ___________________________  Date: ___________________________
Signature / LTI of Applicant

Nomination:
I want to nominate as under

<table>
<thead>
<tr>
<th>Name of Nominee</th>
<th>Relationship</th>
<th>Age</th>
<th>Date of Birth in case of minor</th>
<th>Person authorised in case to receive the amount of deposit on behalf of the nominee in the event of my /minor(s) death</th>
</tr>
</thead>
</table>

Place: ___________________________  Date: ___________________________
Signature / LTI of Applicant

Witness(es)*
1. ___________________________
2. ___________________________

*Witness is requires only for thumb impression and not for signature
UNIT 9.3.3: Costs: Fixed vs. Variables: What are Fixed and Variable Costs?

Unit Objective
At the end of this unit, participants will be able to:
• Distinguish between fixed and variable costs

Resources to be Used
• Participant Handbook
• Blank sheets of paper
• Pens

Ask
• What is cost?
• Will a telephone bill fall under the category of a fixed or variable cost?

Say
• Discuss: Fixed and Variable costs with examples. Let us do a small activity.

Team Activity

1. Rent
2. Electricity bill
3. Machinery
4. Insurance
5. Office supplies/documents
6. Employee salaries
7. Commission per each given to sales person for every unit sold
8. Credit card fees
9. Vendor bills

A
A
A
A
A
A
Do

• Divide the class into two groups.
  Read out the list of costs given in the activity.

• Read out each item from the cost list and ask the groups in turns to ide-rate whether it is a fixed or variable cost.

Say

• We saw that your utility bills like rent, electricity, telephone etc. are all fixed costs because you have to pay it every month.

• Variable costs is an expense which varies with production output or volume. For example, commission, raw material etc.

• Discuss “Cost: Fixed vs. variables” with the participants as given in the Participant Handbook.

• Illustrate the relation between the costs with a graph.

Team Activity

Fixed vs. Variable Costs

• This is a group activity.
  You want to start your own entrepreneur business.

• State the type of business you want to start.

• List down all the costs or requirements for your business.

• How will you differentiate between the fixed and variable costs.

Activity Decription

• What is the total cost of your business?

• What are the fixed costs?

• What are the variable costs?

• How did you differentiate between the fixed and variable costs?
Do

• Instruct the participants that this is group work.
• Divide the class into small groups of 4 or 6.
• Give each group a sheet of paper.
• Tell the participants that they have to start their own entrepreneur business.
• Ask them the type of business they want to start.
• Instruct them to differentiate between the fixed and the variable costs of the business they want to start.
• Give the participants 15 minutes to discuss and write.
• Keep an eye on the groups. Tell the group to wind up quickly if they go beyond the given time limit.

Summary

• Note: You can summarize the unit either by having a role play between a consultant and a budding entrepreneur explaining the differences between fixed and variable costs or by discussing the key points of the unit.

Notes for Facilitator

Answers for the activity - Idea of the type of costs

1. Rent (Fixed)
2. Telephone bill (Fixed)
3. Electricity bill (Fixed)
4. Machinery (Fixed)
5. Insurance (Fixed)
6. Office supplies/ Raw materials (Variable)
7. Employee salaries (Fixed)
8. Commission percentage given to sales person for every unit sold (Variable)
9. Credit card fees (Variable)
10. Vendor bills (Variable)
UNIT 9.3.4: Invetments, Insurance and Taxes

At the end of this unit, participants will be able to:

• Describe the main types of investments
• Describe the different types of insurance products
• Describe the different types of taxes

Resources to be Used

• Participant Handbook

Example

• Let's have a look at a few scenarios.

Ranbir has sold his house and deposited the money in his bank. His Chartered Accountant tells him that he will have to pay tax otherwise he will have to pay capital tax. What is capital tax and how is it different from income tax? 

Jasmeet and Anupra blessed with a baby girl. They decide to have an insurance policy that will mature when their daughter is ready to higher education.

Shivani is working in a corporate office and getting good pay. She will have to pay in some tax so she decides to invest her money in tax-saving schemes. She goes to the bank manager to discuss the best products in which she can invest.
How do I invest in securities, insurances and taxes differently from each other?

Let's learn the differences between the three by having an activity.

We will have a quiz today.

Team Activity

The activity is a quiz.

Divide the class into groups of three and give a name to each group.

Explain the rules of the quiz. For each correct answer, the group gets 1 mark. If the group is unable to answer the question, it is rolled over to the next group.

Explain the purpose and duration of the activity.

On the blackboard write the names of the groups.

Ask the questions of the quiz.

Keep a score for the groups.

Set guidelines pertaining to discipline and expected tasks.

Summarize the unit by discussing the key points and answering questions.

Notes for Facilitators

Questions for the quiz

1. Mr. Das gets monthly return on one of his insurance policies. Name the policy?

2. What are bonds?

Bonds are instruments used by public and private companies to raise large sums of money as it cannot be borrowed from the bank.

3. Who issues the bonds?

Private and public companies issue the bonds.

4. Why are bonds issued?

To raise large amounts of money.
At the end of this unit, participants will be able to:

• Discuss the uses of online banking
• Discuss the main types of electronic funds transfer

Resources to be Used

• Participant Handbook
• Computer System with internet connection
• Debit card

Ask

• When was the last time you visited a bank?
• How do you pay your bills for electricity and telephone?
• Have you ever tried to transfer money from one bank account to another bank account using the online banking facility?

Say

• Most of us lead a busy life. Time has become more important than money. In this busy schedule, no one has time to stand in bank queues. That's where Online Banking comes in. Online banking or internet banking means accessing your bank account and carrying out financial transactions through the internet.

• Discuss "What is online banking?" from the Participant Handbook.

There are various advantages of online banking:

• It saves time, as you need to visit the branch.
• You can conduct your banking transactions safely and securely without leaving the comfort of your home.
• Online Banking also gives you round the clock access.
• Online Banking makes it possible for you to pay your bills electronically.

Do

• Show them how they can use the internet banking.
• Use the computer system and show the demo videos on how to use internet banking provided on most banking sites.
• Tell the class the various features of online banking:
  • Through their website set up your online account.
Facilitator Guide

- Choose a secure username and password.
- Set up your contact information.
- Once your information is verified, you are good to go.
- Once you enter the portal, explore all the features and learn your way through the portal.

One of the biggest advantages that online banking offers, as discussed earlier, is transferring money from one account to another. This transaction is called electronic funds transfer. Electronic transfers are processed immediately, with the transferred amount being deducted from one account and credited to the other in real time, thus saving me and effort involved in physically transferring a sum of money.

Discuss "Electronic Funds Transfer" from the Participant Handbook.

Discuss how to transfer money from one account to another using online banking (NEFT/RTGS, etc.).

Illustrate with an example.

Summarize:
Close the discussion by summarizing what has been talked about so far.

Ask the participants if they have any questions related to what they have talked about so far.
<table>
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UNIT 9.4.1: INTELLIGENT PREPARATION: HOW TO PREPARE FOR AN INTERVIEW?

Unit Objective
At the end of this unit, participants will be able to:

• Discuss the steps to follow prior to an interview.

Resources to be Used
• Participant Handbook

Ask
• Have you ever attended an interview?
• How did you prepare before going for an interview?

Say
• An interview is a conversation between two or more people (the interviewer(s) and interviewee) where questions are asked by the interviewer to obtain information from the interviewee.
• It provides the employer with an opportunity to gather sufficient information about a candidate and help them select the ideal candidate.
• It also provides the interviewee with an opportunity to present their true potential to the employer, build confidence and help make a decision about the job by asking questions regarding designation, salary, perks, benefits, promotions, transfers, etc.

Activity
1. Introducing Yourself
• Select a participant and ask him/her to answer the following questions: “What can you tell me about yourself.”
• Give the participant at least one minute to speak.
• Once he/she is done, ask the rest of the participants what they gathered about the participant who was providing information.
• Now repeat the exercise with five other participants.
• What information you should include when you are describing or introducing yourself in an interview?

• What information you should not include when you are describing or introducing yourself in an interview?

Say

• Tell the participants that when an interviewer asks you to say something about yourself, he/she is not asking you to present your life history.

• Introduction should be short and crisp, and should present you in a positive light. It should include the following points:
  - Any work experience that you might have
  - A brief summary of your educational qualifications
  - Your strengths and achievements
  - Any special projects that you might have been part of

• The following topics should be avoided during an introduction:
  - Detailed description of your family (unless you are specifically asked to do so)
  - Too much information about your weaknesses
  - Information that is not true

Do

• Congratulate each participant for sharing their points.

• Ask the audience to applaud for them.

• Ask detailed questions to cull out the information from each group.

• Keep a check on me.

Activity 2

• Planning the right attire:

Do

• Describe 2 individuals to the participants. One is wearing a casual t-shirt, jeans, and slippers. He has not combed his hair and neither has he trimmed or shaved his beard. The other individual is dressed formally with a shirt and pant, and is well-groomed. He has also worn formal shoes and a belt. Ask the participants which person would they prefer to hire in their organization and why?
• Close the discussion by discussing ‘how to prepare for an interview’ as discussed in the Participant Handbook.

• You can add the following points to it:
  o Tell the participants to create a positive and good impression in an interview. It is important for them to prepare for an interview beforehand.
  o The interviewer analyses not only your technical knowledge in relation to the job, but also whether or not you are a fit for the organization.
  o Every employer looks at the whole package and not just one or two things in isolation. Therefore, the way you dress and the way you present yourself is also important along with your skills and talents.
  o The participants will get only one chance to create a good first impression.
Preparing an Effective Resume: How to Create an Effective Resume?

Unit Objective
At the end of this unit, participants will be able to:
• Discuss the steps to create an effective resume

Resources to be Used
• Participant Handbook
• Blank Papers
• Pens

Ask
• When preparing for an interview, what are the most important things that you need to do?
• What documents do you carry with you, when you go for an interview?
• What is a resume?
• Why do you need a resume?

Say
• Resume is not just a sheet of paper with your qualifications printed on it.
• It is a selling tool that will help the employer to see how and what you can contribute for company.
• Talk about the steps involved in creating an effective resume discussed in the Participant Handbook.
• Now let's prepare a resume to understand the process better.

Do
• This is an individual activity.
• Give the details of the activity.
• Instruct them to read the activity carefully.
• The participant is expected to make an effective resume based on the information provided.
• Give the class 25-30 minutes to study the case and create a resume.
• At the end of 30 minutes, the participants should exchange the resume with the person sitting next to him or her.
• Every participant will evaluate the resume prepared with their fellow participants.
In the first activity, the candidate should apply for the job position. In the second activity, the candidate should create a resume for the job position. In the third activity, the candidate should keep his mobile number. In the fourth activity, the candidate should keep his email. In the fifth activity, the candidate should keep his house number. In the sixth activity, the candidate should keep his address. In the seventh activity, the candidate should keep his personal number. In the eight activity, the candidate should keep his personal address. In the ninth activity, the candidate should keep his personal email. In the tenth activity, the candidate should keep his personal mobile number. In the eleventh activity, the candidate should keep his personal house number. In the twelfth activity, the candidate should keep his personal address.
Facilitator Guide

Do

• Congratulate each participant for making their first attempt towards creating an effective resume.
• As a follow-up activity, you can suggest them to prepare their own resume and show it to you the next day.

Summarize

• Close the discussion by showing some effective resume samples to the candidates.
• Ask the participants what they have learnt from this activity.
• Ask if they have any questions related to what they have talked about so far.

Notes for Facilitator

• Keep printed copies of the activity ready for the session.
• Put down the suggested format of the resume on the board while explaining the steps in preparing a resume.
• Do check the participants' resume and suggest necessary changes.
• Suggested example for the case presented:

Nipes
Singla
#1XX7,
Secretary
XX-X-D
Chandigarh-160018

Mobile
No: 91-988XXXXX01
E-mail: nxxxxxxxxxla@gmail.com

Objective:
Seeking an opportunity to use my interpersonal skills and experience to contribute to your company's growth, profit ability and objectives.

Professional strengths:
• Proficient in housekeeping
• Experienced in and capable of working with a diverse work force
• Team player and friendly in nature
• Successful working in a multicultural environment
• Detail oriented, flexible, and adaptable
• Knowledge of Mi\r\r
\r
Educational background
• Diploma in Hotel Management and Catering, Westwood School of Hotel Management, Zirakpur
• High School, Government Senior Secondary School, Sector 15, Chandigarh
### Wireman Control Panel

**Professional Internship:**

- **Housekeeping Intern,** XYZ Group of Hotels, New Delhi (June 2010 – August 2010)
  - Responsible for cleanliness and maintenance of one floor in the hotel.
  - Got opportunities to make housekeeping arrangements for corporate meetings.

### Volume Work:

- **Student volume at children's hospital in Chandigarh.**

Nipesh Singla
UNIT 9.4.3: IN THE INTERVIEW FAQs

Unit Objective
At the end of this unit, participants will be able to:

• Discuss the most frequently asked interview questions
• Discuss how to answer the most frequently asked interview questions

Resources
to be Used
• Participant Handbook

Say
• Tell the participants you will provide them with interview situation and questions and they have to try to answer them.
• Tell them you will also explain the different ways to approach these questions.

Do
• Divide the class in pairs and ask the participants to perform a role play.
• One partner will play the role of the interviewer while the other will play the role of the interviewee.
• Tell them the interviewer can start the interview by asking the interviewee to introduce himself/herself.
• Call all the pairs one by one in front of the class to enact the role play.
• Follow the same pattern for all other situations.
• Time allotted for each situation is 8-10 minutes.
• Congratulate each participant for giving their input.
• Ask the class to applaud each team has completed their role play.

Role Play Conduct a role play for the situation given.

Situation 1
• The interviewer will start by asking the interviewee a few generic questions such as:
  o What is your name?
  o Tell me something about yourself?
  o Can you tell me something about your family?
Role Play

Conduct a role play for the situation given.

Role Play – Situation 2

Then, the interviewer will blantly ask the following questions:

• How do you explain this huge gap in your resume?
• What is the reason for this?
• Weren't you looking for a job or is it that no one selected you?

Say De-brief:

• When you put information on your resume, you should be prepared to answer any questions about it.
• Be present and focused on the questions being asked to you.
• One way of tackling the blunt questions is to tell the interviewer you did not come across an opportunity where you were sufficiently satisfied with both the remuneration offered as well as the profile. Therefore, you waited for the right opportunity to come along while looking for an ideal job.
Role Play – Conduct a role play for the situation given.

Role Play – Situation 3

• The interviewer will start by asking the interviewee a few generic questions such as:
  o What is your name?
  o Tell me something about yourself?
  o Can you tell me something about your family?

• Then, lean forward, clasp your hands on the table and in a soft voice ask the interviewee:
  o Did you ever experience any neglect or disregard from your previous office? In other words, did you ever suffer because your office or team displayed favoritism?

Say Debrief:

• Keep this in mind: Do not criticize anyone during an interview.
• You are free to express your opinion, however, your language, answers, body language, and the tone of your voice should remain constructive and neutral.
• Since criticism will show you in negative light, you should keep your answers honest yet diplomatic.
• You can tackle such questions by saying, “I got along well with most of my faculty and peers.”

Role Play – Situation 4

• The interviewer will start by asking the interviewee a few generic questions such as:
  o What is your name?
  o Tell me something about yourself?
  o Can you tell me something about your family?

• Then very bluntly ask the interviewee:
  o How long do you plan to stay with this company if you are selected?

• After the candidate responds, ask sarcastically:
  o Do you seriously mean that?

Say Debrief:

• Don’t provide unreal and idealistic answers.
• Your answers should be honest yet diplomatic. In a situation like this, the interviewer does not expect you to provide a specific timeline.
1. Ask them to provide a brief introduction about themselves.

2. Politely apologize for being late.

3. Avoid giving any excuses.

4. Don't oversize. Once this response is out of the way, turn your focus back to the interview.
Facilitator Guide

Say De-brief:

• If the interviewee is not ready for you to avoid this question, respond to the interviewer by providing a reasonable and well-thought-out salary range.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 7

• The interviewer will start by asking the interviewee a few generic questions such as:
  o What is your name?
  o Tell me something about yourself?
  o Can you tell me something about your family?
• Then, bringing the interviewee to a close, ask the interviewee:
  o Do you have any questions for me?

Say De-brief:

• Ask relevant questions.
• Don’t bombard the interviewer with questions.
• If you have questions about the result of the interview, you can limit your questions to 1 or 2. Keep them short and relevant:
  o When will I be informed about the results of the interview?
  o What are the working hours?
  o Will the job require me to travel?

Explain

• Tell the participants to be prepared for answering different types of questions in an interview.
• Stay calm and focused, and take a moment to think about how you should respond. Always maintain a confident tone.
• Even if you don’t intend to, your body language conveys your level of discomfort with a particular question.
• Try to keep your answers, tone, and gestures neutral.
• Maintain your composure while answering personal questions.

Do

• Tell all the participants to form pairs again.
• Tell them to use the following list of frequently asked interview questions to conduct mock interviews.
They will use all or some of these questions to conduct mock interviews with their partners. One partner will play the role of the interviewer while the other will play the role of the interviewee. After they are through asking and answering the questions, the roles will be reversed. The same list of questions will be used again. After each mock interview ask the interviewer to provide feedback and clear any doubts that may arise. Time allowed for each situation is 30-35 minutes.

Activity
Mock Interview Questions

Tell me something about your family.

What qualities would you look for in a Manager or a Supervisor?

Why did you apply for this job?

What do you know about this company?

How do you deal with criticism?

How do you plan to strike a good work-life balance?

Where do you see yourself five years from now?

Have you applied for jobs in other companies?

What kind of salary do you expect from this job?

Do you have any questions for me?

Summary
• Close the discussion by discussing the questions in both activities.
• Ask the participants what they have learned from this activity.
• Ask if they have any questions related to what they have talked about so far.
UNIT 9.4.4: Work Readiness – Terms and Terminology

Unit Objective
• At the end of this unit, participants will be able to:
  • Identify basic workplace terminology

Resources to be Used
• Participant Handbook
• Chart paper
• Blank sheets of paper
• Pens

Ask
• What do you understand by workplace terminology?
• Are folks left and right of employment the same?

Say
• Let's start this unit with an activity.

Team Activity Workplace Terminology
• This is a group activity conducted in three parts.

Part 1
Sheila received a call from the recruiter of MND Company. Before she is recruited by the company, think of the recruitment process she will have to go through. Start from the telephone call to signing her letter of acceptance. Write down all the words that come to your mind.

Activity Debrief
• Have the participants read out the words they have written
• Encourage all the participants to participate in the activity.
Divide the class into small groups of 4 or 6.

Instruct the participants that they will be doing a brainstorming activity.

Give them one chart paper each. Tell them to divide the chart in two parts.

Instruct them that they have to use one half of the chart paper now. The other half will be used later.

The participants have to write all the words that come to their mind related to the recruitment process.

Give them 10 minutes to do the activity.

Tell them that there are no right or wrong answers.

Keep a track of the time.

You all know quite a few words related to the terms used in the office.

Let us talk about some new terms that have been missed out.

Discuss “Work Readiness – Terms and Terminology” with the participants as given in the Participant Handbook.

Ask why is it important to know the workplace terms?

How do they help?

Can the words be categorized further?

Let’s now continue the activity.

Team Activity Terms and Terminology

This is again a group activity. The members of the group remain the same as in Activity 1.

Part 2

With the help of the new terms you have learned, make a flowchart of the hiring process of MND Company.

Activity Debrief

Ask the groups to share the flowcharts and the new terms they added while preparing the flowchart.
Do

• Instruct the participants that they have to use the 2nd half of the same chart they had used before.

• Using the new terminology and the terms they had previously written on the chart, they have to make a flow chart of the hiring process of the MND Company.

• Give them 10 minutes for this activity.

• Keep a check on them. Tell the group to wind up quickly if they go beyond the given time limit.

Say

• Let's go ahead with the activity.

Team Activity

Terms and Terminology

• The activity continues with the same group members.

Part 3

Sheila now works for the MND Company. She is not aware of the company culture and policies. Can you think of the terms for which she wants clarity? Make a list of those words.

Activity-Brief

• Ask the groups to share their list of words. Some of the words are benefits, compensation, deduction, employee training, holidays, lay-off, leave, maternity leave, mentor, notice, paternity leave, and time sheet.

Do

• Instruct the participants to identify the key terms an employee of a company should know. They can use the same chart paper for this activity.

• Give them 5 minutes for this activity.

• Keep a check on them. Tell the group to wind up quickly if they go beyond the given time limit.

Summary

• Note: You can either summarize the key points of the unit or have a role play when an employee has just joined a company and the HR Manager explains the terms of employment.
Key Learning Outcomes

UNIT 9: Understanding Entrepreneurship

Discuss the characteristics of entrepreneurs and how they differ from managers.

Discuss the purpose of entrepreneurship and how it contributes to innovation.

Discuss the types of ventures and the different business models.

Discuss the processes of problem-solving and risk assessment in entrepreneurship.

Discuss the importance of entrepreneurship in sustaining business and creating opportunities.

Discuss the role of entrepreneurship in economic development and social change.

Discuss the challenges and opportunities faced by entrepreneurs.

Discuss the impact of entrepreneurship on the economy and society.

Discuss the role of entrepreneurship in promoting innovation and creativity.

Discuss the impact of entrepreneurship on employment and economic growth.

Discuss the impact of entrepreneurship on the quality of life and social well-being.

Discuss the impact of entrepreneurship on the environment and sustainability.

Discuss the impact of entrepreneurship on the distribution of wealth and income.
UNIT 9.5.1: Concept Introduction (Characteristics of an Entrepreneur, Types of Firms/Types of Enterprises)

Unit Objectives
At the end of this unit, the participants will be able to:
• Discuss the concept of entrepreneurship
• Discuss the importance of entrepreneurship
• Discuss the characteristics of an entrepreneur
• Describe the different types of enterprises

Resources to be Used
• Participant Handbook

Team Activity

Quiz Questions
1. Who is the founder of Reliance Industries?
   Dhruvibhai Ambani

2. Who is the Chairman of Wipro Limited?
   Azim Premji

3. Who launched e-commerce website Flipkart?
   Sachin Bansal and Binny Bansal

4. Who is the founder of Paytm?
   Vijay Shekhar Sharma

5. Who is CEO of OLA Cabs?
   Bhavish Aggarwal

6. Who is the founder of Jugnoo?
   Samar Singla (autocraticegatore)

7. Who is the founder of OYO Rooms?
   Bhavish Aggarwal

Let's start this session with interesting questions about Indian entrepreneurs.
Divide the class into two groups.

In turns ask the quiz questions to the groups.

If the answer is incorrect pass the question to the other group.

Share the answer if the groups are not able to answer.

Congratulate the participants who answered correctly.

Ask:

- What do you understand by entrepreneurs?
- What is the importance of entrepreneurship in today's scenario?
- What do you think are the characteristics of successful entrepreneurs?
- What are different types of enterprises that an entrepreneur in India can own and run?

Say:

Talk about entrepreneurs, importance of entrepreneurship, characteristics of successful entrepreneurs, and different types of enterprises in India as discussed in the Participant Handbook.

Tell the participants, stories of successful Indian entrepreneurs—their struggles, the moments of heartbreak, the perseverance and triumph.

Ask them if they know of any such entrepreneur.

Summarize:

Close the discussion by summarizing about the opportunities for entrepreneurs in India.

Notes for Facilitator:

- Check out different Government schemes for small entrepreneurs. Share the information with the participants.
- You can tell them about the government websites like Start Up India, mudra.org.in etc.
- Discuss about various schemes and policies by the Government of India for entrepreneurs.
UNIT 9.5.2: Leadership and Teamwork

Unit Objectives
At the end of this unit, participants will be able to:
• List the qualities of an effective leader
• Discuss the benefits of effective leadership
• List the traits of an effective team

Resources to be Used
• Participant Handbook
• Blank sheets of paper
• Pens

Do
• Show the picture given below to the class.
• Ask them to quickly write on a piece of paper what comes to their mind after seeing the picture.
• Now ask them, “What do you understand from this picture?”
• Encourage participants to share their thoughts.

Say
• This picture depicts the qualities of a leader and the difference between a leader and a boss.
• A boss focuses on structure and inspires fear whereas a leader follows vision and generates enthusiasm.
• A boss blames employees for the breakdown whereas a leader fixes breakdown.
• A boss depends on authority whereas a leader depends on goodwill.
• A boss says “I” and a leader says “We.”
• A boss drives employees whereas a leader coaches them.
Say

• Talk about leadership and leadership qualities for an entrepreneur as discussed in the Participant Handbook.

Ask

• Why is it important for a leader to be effective? How does it help the organization?

Say

• Let us discuss benefits of effective leadership as discussed in the Participant Handbook.

• “Out-of-the-box thinking” is one of the new leadership styles. It means thinking differently and from a new perspective.

Ask

• Do you consider yourself a team player?

Team Activity: Long Chain

• This is a group activity.

Do

• Divide the class into 2 teams.

• Ask each team to create a chain using materials they have in class such as shoe laces, belts, paper, handkerchief, ribbons, etc.

• The team that creates the longest chain wins the game.

• Observe if the participants are interacting with their team or working in isolation.

• Share your observations with the class.

Say

Debrief:

• What did the winning team do differently?

• Who was responsible for the winning team’s success?

• How does this activity explain the role of teamwork in entrepreneurial success?

Say

• Tell the class that both the teams performed well.
• Discuss that the objective of this activity was to open communication channels and how this has been achieved.
• The participants should aim to keep the communication channels open when interacting with their peers and team members.
• It will set the pace and enthusiasm required for all the ensuing teamwork activities.
• Talk about teamwork and importance of teamwork in entrepreneurial success as discussed in the Participant Handbook.

Summary
• Close the discussion by summarizing about the importance of teamwork for employees.
  - Teamwork helps in reducing stress for the employees.
  - Teamwork helps employers in generating more number of solutions to a problem and developing improved communication amongst employees.
• Ask the participants what they have learned from these exercises.
• Ask if they have any questions related to what they have talked about so far.
UNIT 9.5.3: Communication Skills: Listening & Speaking:

The Importance of Listening Effectively

Unit Objectives
At the end of this unit, the participants will be able to:
• Discuss the importance of listening effectively
• Discuss how to listen effectively
• Discuss the importance of speaking effectively
• Discuss how to speak effectively

Resources to be Used
• Participant Handbook

Activity
Activity – Chinese Whisper

Step 1: Form a circle.

Step 2: Start a whisper chain. Any one participant will whisper a message into his/her neighbour’s ear. No one else must hear the message. The message can be serious or downright silly.

Step 3: The next person who hears the message should whisper the message very quickly to the person sitting next to them.

Step 4: The game goes on until the last person says whatever they hear out loud and the first person reveals the real message.

Compare them and have a great laugh!

Ask –
• No, the original message was not the same as the end of the game.
• The barriers to communication like language, disturbance and noise, poor listening skills, boredom, poor speaking skills, etc. are the potential reasons this happens.
There are various aspects to communication. Speaking skills and listening skills are two major components to any communication. There is always some room for improvement in the way we communicate.

It is important to accept the reality of miscommunication and work to minimise its negative impacts.

Communication is a two-way process where people exchange information or express their thoughts and feelings. It involves effective speaking and effective listening.

If I go to the store to get bread, I exchange money for the bread. I give something and get something in return.

Communication takes place in the same manner. You have to provide and receive information for communication to take place.

How often do you hear these statements?

• “You're not listening to me!”
• “Why don’t you let me finish what I’m saying?”
• “You just don’t understand!”

What do you think the other person is trying to convey to you through these sentences?

We will not talk about the importance of listening effectively as discussed in the Participant Handbook.

Let’s play a game to understand effective listening better.

This is a class activity. The participants need to answer the questions they hear. Instruct them to listen carefully. You will read it at a stretch and if need be repeat it once more. Tell the participants to raise their hand if they know the answer to the question asked. Keep a check on me.
De Riddles: Activity

Who and why build a house?

Oh, yes, and why the man builds a house.

If possible, ask a widow.

If a house can't be built in 26th January, where is the house?

If the alarm rings at half past nine, what time is it?

If a man goes to the bed at 2 o'clock in the afternoon, what time is it?

If you have a 100 rupees note, how much is it?

If you are marrying a widow's son, which son?

If you have 2 sons and each of them has 1 son, how many sons do you have?

If you have 2 sons and one son has a son, how many sons do you have?

If you have 2 sons and one son has 1 son, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?

If you have 2 sons and one son has 2 sons, how many sons do you have?
A Do you have another chance, what would you have said to this person? If you were prepared, you're sure they would have stayed long enough to schedule a meeting.

A businessman. He has financed a lot of small business ventures and can finance your new start up too. Aer exchanging pleasantries, he asks you what your new company does. You open the floor to the participants to create a great pitch, but bear in mind that there is a difference between hearing and listening.

A There was once a student who was looking for a job at Apple. He went to a meeting where the CEO was present. After the CEO went around the room greeting everyone, he was looking to meet with the student. The student was prepared, he had all the facts about the company and knew exactly what he wanted to say. The CEO was impressed with the student's preparation and agreed to meet with him.

A You? Yes, you! It's your turn to present your idea. Don't forget the importance of enthusiasm.
4. Put your feedback into practice

5. Spend time on your unique strengths

6. Take feedback seriously, listen carefully, and act

Example:

The wireman control panel

Put your feedback into practice

5. Spend time on your unique strengths
Facilitator Guide

UNIT 9.5.4: Problem Solving & Negotiation Skills

Unit Objectives
At the end of this unit, participants will be able to:

• Discuss how to solve problems
• List the important problem-solving traits
• Discuss ways to assess problem-solving skills
• Discuss the importance of negotiation
• Discuss how to negotiate

Resources to be Used
• Participant Handbook

Ask
• What is a 'problem'?  

Say
• Discuss the definition of problem as given in the Participant Handbook.

• In a hurdle race, the hurdles are the obstacles on the way to reach your goal. Similarly, obstacles are the hurdles you may face while reaching your goal, i.e., to set up your own business. Your goal will be to reach the finishing line after crossing these hurdles.

Ask
• What do you do when you face a problem?
• How do you resolve it? You can pick examples from the question asked previously 'the problems they are likely to face in the process of becoming a successful entrepreneur'.

Say
• Discuss how to solve problems as given in the Participant Handbook.

Team Activity
• This is a group activity.
• The groups will solve the problem and come up with the best solution in each case.
1. Unable to arrange for some extra finance for setting up a beauty parlour. The loan sanctioned and disbursed is not enough. You have tried all your contacts, friends and relatives. But unable to manage the extra amount. Bank will not sanction more amount as you have used up the complete sanction limit.

2. You have rented a space for your business and all arrangements are done. You will be operating from the office space rented in two days. Now the owner comes up to you and says he wants to sell the place and wants you to vacate in 15 days.

3. You have just set up your business and need extra human resource. You have tried inviting a few also ended up with an agency for getting the right candidate. But you are unable to get the right candidate. If the candidate is good, you cannot offer the salary demanded. If the candidate agrees to the salary, he/she has other demands like working hours to be reduced, leaves etc. which may not work for your setup.

- Divide the class into three groups. Give one scenario to each group.
- Explain the purpose and duration of the activity.
- Ask the groups to build on the scenario and present their solution as a role play.

Say
1. What was the problem?
2. Is there any other alternative solution?
3. Is this the best solution presented?

Ask
- Try to think of some people around you who are able to solve problems very easily. Even you or your friends might be approaching them when there is a problem. What qualities do they have? What personality traits do such people possess?

Say
- Discuss the important traits for problem-solving as given in the Participant Handbook.

Ask
- In order to build a successful organization, you need to hire people who possess good problem-solving skills.
- How would you assess the level of problem-solving skills of potential candidates before hiring them?
Facilitator Guide

Say

• Discuss how to assess for problem-solving skills as given in the Participant Handbook.

Summarize

• Ask the participants the things that they have learnt so far.
• Ask if they have any questions related to what they have talked about so far.
• Summarize the discussion on problem solving.

Activity

• The activity is to organize an election event. Select three volunteers from the group. They have to give a speech on their election manifesto to the class. They have to negotiate with the fellow participants and convince them to vote for them. The best negotiator will win the election.

Do

• Ask three participants to volunteer for the activity.
• Explain the purpose and duration of the activity.
• Set guidelines pertaining to discipline and expected tasks.

Ask

• Out of the three contestants, whom would you support? Why? What did they say or do which convinced you to make your decision?
• Have you ever tried to negotiate in your personal or professional life?
• Ask the class to share some of their experiences where they have been able to strike a deal by negotiating.

Say

• Discuss "What is Negotiation?" as given in the Participant Handbook.

Ask

• Why is it important to negotiate? As an entrepreneur, where do you think that negotiation skills will be needed?

Say

• Discuss the importance of negotiation while starting a business as given in the Participant Handbook.
Discuss the important steps to negate as given in the Participant Handbook.

- Conduct a role play activity.
- Ask the participants to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

- Divide them into groups of four (4) (depending on the batch size).
- Give them the handouts for role play scenarios.
- Two groups to be given scenarios on problem solving.
- Other two groups to be given scenarios on negotiation.
- The groups will build on the scenarios and prepare for the role play.
- Give the groups at least 5 mins to discuss and be ready with the role play.
- Invite each group one by one to come and present their role play.

**Problem solving Scenario 1**

Avinash has a Mobile Repair Store in Allahabad. His outlet is one of the most popular ones in the vicinity and he has great rapport with his customers. He is always well-dressed, jovial and full of energy.

It’s around 11 AM, when a customer barges in to the shop and starts shouting at Avinash for giving her back the instrument which is still not working. The screen of her mobile is also cracked from one side. Avinash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue the company and to go to Consumer Court for cheating her.

**Problem solving Scenario 2**

You are running a successful small scale business, Shreeji Aggarbaas. Your staff members do door to door selling and organise marketing campaigns in local markets. Your brand has established its name in the last few years.

Recently, lots of customers have been coming to you and lodging complaints that your staff members indulge in malpractices. Few of them informed you that a staff member engaged them in a friendly conversation. In the meanwhile, the other gave them lesser packets of aggars than they paid for.

Another set of customers lodged complaints about the misconduct and rude behaviour of a particular staff member. You have already been struggling with shortage of staff and such complaints are a serious concern as it is hampering your brand image. What strategies will you adopt to solve this problem?
### Facilitator Guide

#### 6. Conducting the interview

1. **Preparation**
   - Gather information about the candidate:
     - Education:
       - Degree(s)
       - GPA
     - Experience:
       - Previous roles
       - Duration
     - Skills:
       - Technical
       - Soft
     - Personal traits:
       - Communication
       - Teamwork
   - Review the job description:
     - Core requirements
     - Desirable skills
   - Prepare potential questions:
     - Open-ended questions
     - Behavioral questions

2. **Conducting the interview**
   - Introduce yourself:
     - Brief overview of the company
     - Role of the position
   - Ask open-ended questions:
     - Demonstrate understanding
     - Highlight skills
   - Conduct behavioral questions:
     - Experience in relevant projects
     - Handling of challenges
   - Assess personality:
     - Interpersonal skills
     - Adaptability
   - Summarize the discussion:
     - Recap of key points
     - Next steps

3. **Closing the interview**
   - Thank the candidate for their time:
     - Polite and appreciative
   - Provide feedback:
     - Constructive
     - Anonymous
   - Follow up:
     - Next steps
     - Contact information

---

#### 4. Negoating the salary

- **Scenario 1**
  - You have interviewed a prospective candidate who demands a salary that is 20% higher than your offer.
  - You are a young entrepreneur who has just registered your start-up project and applied for a bank loan accordingly.
  - If you paid the required salary for the new person, then you would have to restructure your financial plan.
  - Profits will be affected.

- **Scenario 2**
  -Negotiate a salary that meets your financial constraints.
  -银行贷款审批
  -If you receive a loan, you have funds to pay the candidate's salary.

---

#### 3. Preparing for the opportunity

- **Two people**
  - Attend a training session to prepare for the interview.
  - Review the job description and prepare questions.
  - Be ready to discuss your skills and experience.

---

#### 2. As a young entrepreneur...

- **Case study**
  - You register your start-up project and apply for a bank loan.
  - You are searching for an individual with this skill level for three months.
  - You have taken an appointment to meet the manager and show your business plan.

---

#### 1. Conducting the interview

- **Role of the facilitator**
  - Facilitate the dialogue between the interviewer and the candidate.
  - Ensure the discussion is focused on the candidate's skills and experience.
  - Provide constructive feedback.

---

#### 03.01.05

**A**
Wireman Control Panel

Encourage participants to provide constructive criticism during their discussions.

Summariize by wrapping up the unit with a summary of the key points and answering questions.
Unit Objectives

At the end of this unit, the participants will be able to:

• Discuss how to identify new business opportunities
• Discuss how to identify business opportunities within their business

Resources to be Used

• Participant Handbook
• Blank sheets of paper
• Pens

Ask

• How does an entrepreneur identify an opportunity?
• What do you think are the common queries or concerns faced by entrepreneurs?
• How can you identify new business opportunities?

Say

• Let's talk about opportunity, common queries or concerns faced by entrepreneurs, ideas as an opportunity, factors to consider when looking for opportunities, ways to identify new business, and opportunity analysis as discussed in Participant Handbook.
• Let's do an activity to understand ways to identify business opportunities within your business.

Do

• Tell the class that this is an individual activity.
• Tell the participants to create a matrix on their notebooks.
• There will be four boxes in your matrix.
• Strength, Weakness, Opportunity and Threats will be the four headings of the matrix. This is called the SWOT matrix.
• Read out the questions to them and tell the participants they need to answer the questions asked in each matrix.
• Tell them they can also use their own understanding of themselves to fill the SWOT matrix.
**Activity**

Do your SWOT analysis

Strengths—What are your strengths?

Weaknesses—What are your weaknesses?

Opportunities—What opportunities are available to you?

Threats—What do other people value about your strengths?

**Summary**

Close the discussion by summarizing ways to identify business opportunities within your business.

Ask the participants what they have learned from this exercise.

Ask if they have any questions related to what they have talked about so far.

• Congratulate everyone for the class activity.

• Ask the audience to applaud for themselves.

• Allot the participants sufficient time to complete this activity, but do keep a check on them.

• Ask de-brief questions to cull out information from the participants.
UNIT 9.5.6: Entrepreneurship Support Eco-system

Unit Objectives
At the end of this unit, participants will be able to:
• Explain the meaning of entrepreneur
• Describe the different types of entrepreneurs
• List the characteristics of entrepreneurs
• Recall entrepreneur success stories
• Discuss the entrepreneurial process
• Describe the entrepreneurship ecosystem
• Discuss the purpose of the 'Make in India' campaign
• Discuss the key schemes to promote entrepreneurs

Resources to be Used
• Participant Handbook
• Chart papers
• Marker pens
• Pencils
• Colour pencils
• Scale
• Eraser
• Other requisite stationery material

Ask
• Do you think that entrepreneurs need support?
• What do you think is an ecosystem?
• What do you think 'entrepreneurship support ecosystem' means?

Say
• Let's learn what entrepreneurship support ecosystem means.
• Discuss 'Entrepreneurship Support Ecosystem' as given in the Participant Handbook

Ask
• Can you define entrepreneurship support ecosystem?
• What are the key domains of the support ecosystem?
Let’s learn more about these domains by conducting an activity.

You have to make a poster showing the components of the six main domains of entrepreneurship ecosystem.

Team Activity

• Divide the class into groups of four or six.
• Hand out chart paper and colored pens.
• Explain the purpose and duration of the activity.
• Go around checking the progress of each group.
• Set guidelines pertaining to discipline and expected tasks.

Activity Description

Ask each group to display their poster and explain the key domains of entrepreneurship ecosystem.

Fig 9.5.2: Key domains of entrepreneurship ecosystem.

Ask

• What kind of government support ecosystem is available for entrepreneurship in India?

Say

• Discuss ‘Make in India’ campaign as given in the Participant Handbook.

Entrepreneurship

Market

Policy

Finance

Culture

Support

Human Capital
Team Activity

• Present key schemes to promote energy.

Do

• Divide the class into pairs.
• Number each pair from 1 to 15.
• Assign a scheme, same as their group number, to each group.
• Ask them to read the scheme carefully and present it to the class.
• Explain the purpose and duration of the activity.
• Go around checking the progress of each group.
• Set guidelines pertaining to discipline and expected tasks.

Activity Debrief
• Ask each group to explain the scheme of the pattern to promote energy.

Summary
• Summarize the unit by discussing the key points and answering questions the participants may have.
At the end of this unit, participants will be able to:

• Discuss the relationship between entrepreneurship and risk appetite

• Discuss the relationship between entrepreneurship and resilience

• Describe the characteristics of a resilient entrepreneur

Resources to be used:

• Participant Handbook
• Chart papers
• Blank sheets of paper
• Pens
• Marker pens

Ask:

• Can you define risk or explain what constitutes a risk?
• What do you mean when they say, “This may be a risky proposition”?
• What risks are they talking about?

Example:

Let’s have a look at these two examples:

Rohit and his family were travelling by car from Delhi to Nainital. It was their second trip there. Rohit was familiar with the road. His friends told him that the highway after Rampur was in a bad condition. They advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road. This road is in a better condition. Since he was going with his family, and did not want to take the risk of getting lost, he left early. He took the Kaladhungi road and reached Nainital well in time.

Suresh and his family too were travelling by car from Delhi to Nainital. It was their second trip there. His friends too advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road as this road was in a better condition. Suresh too decided to take the Kaladhungi road but he left Delhi in the afternoon. It was dark by the time he reached Kaladhungi, and he was sure that he was taking the correct turn. As it was late, he could not find anyone to give him directions. He ended up being in an unknown place that was scarcely inhabited.
• Let’s see what type of risks Rohit and Suresh took.
• Discuss 'Risk Appetite and Resilience' with the participants as given in the Participant Handbook.

TEAM ACTIVITY

• This is a group activity.
• In the previous unit, you read success stories of Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
• Mr Ambani left his job and started his company Reliance with just Rs. 50,000/-.
• Dr Patel kept his job, went door-to-door to sell Nirma, and only when the brand started gaining popularity did he start his own company.
• What types of risk did both of them take?
• What risk factors, do you think, did they keep in mind before launching their company?
• Write the Risk Appetite Statement of both the companies.

ACTIVITY DEBRIEF

• Who took a greater risk?
• What are the differences between the Risk Appetite Statement of both the companies?

DO

• Instruct the participants that this is group work.
• Divide the class into small groups of 4.
• Give each group a chart paper.
• Tell the participants that they have to evaluate the risks taken by Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
• Give the participants 15 minutes to discuss and write.
• Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

ASK

• Do you think all entrepreneurial ventures are successful?
• What happens if the first venture is not successful?
Should the entrepreneur stop when faced with challenges or face them?

**Example**

Let’s have a look at the following example:

Vijay Shekhar Sharma is the founder of Paytm, which is a giant Indian e-commerce. He was born in a middle-class family in Uttar Pradesh. He started his first job at an MNC. He quit after six months and built a company One97 with his friends. As One97 grew bigger, it needed more money because it was running more servers, bigger teams, and had to pay royalty. At that time, the tech bubble popped and technology companies were running in losses. Finally, money ran out. So One97 took loans and then more loans at higher rates of interest, as high as 24 per cent, and became caught in a vicious cycle.

In 2014, Paytm was launched with online wallet services after which, the company enabled online payment transactions. The company got licenses from RBI in 2016 to launch India’s first ever payment bank. Moreover, the main move of Paytm was to transform India into a cashless economy.

Demondization came into effect, Vijay Shekhar Sharma started promoting online and digital transactions to deal with the cash crunch. In fact, the service of the company’s mobile wallet is accepted across India. The logo of Paytm is now popular almost everywhere from tea stalls to major companies.

**Say**

Let’s see what qualities made Vijay Shekhar Sharma a resilient entrepreneur.

Discuss Entrepreneurship and Resilience with the participants as given in the Participant Handbook.

**Team Activity**

Entrepreneurship and Resilience

This is a group activity.

Think of some entrepreneurship ventures that faced challenging mes, but later resulted in success stories.

Who is the founder of that company?

What challenging mes did it face?

How did it overcome those challenges?

List the resilient characteristics of the entrepreneur.
Facilitator Guide

Activity

- Each group to give their presentation.
- Why did you choose this company?
- What is the success story of the company?

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to think of an entrepreneur who faced challenging situations, but eventually succeeded.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize

- You can summarize the key points of the unit.
- Ask the participants what they learned from the activities.
- Clarify any questions or doubts they might have.
Unit Objectives

At the end of this unit, participants will be able to:

• Discuss how to deal with failure

Resources to be Used

• Participant Handbook

Ask

• Have you heard the quote ‘nothing is impossible’?
• What do you think it means?
• Do you think that all successful entrepreneurs became famous overnight or did they have to struggle for succeeding?

Example

• Let’s have a look at this example.

Shah Rukh Khan, also known as, SRK or King Khan is a force to reckon with. Did he achieve stardom overnight?

Shah Rukh Khan, who has seen many struggles in his life—he has slept on streets, struggled to support himself and his sister at a very young age, and lost his parents very early in life, which led to his sister seeking mental health support. Amidst all the chaos and challenges, he kept pushing himself, and today he stands tall as the ‘Badshah of Bollywood’. Certainly, those years were not easy for him.

When he was young, he stood at Marine Drive and said, “I will rule this city one day”. Failure was not just his companion during or before his stardom, it is still a substantial part of his life. Success does not come easy. What made him a star was his acceptance of failure and the urge to improve.

Say

• How do you define success and failure?
• What is fear?
• Discuss “success and failure” with the participants as given in the Participant Handbook.
Facilitator Guide

Ask

• Have you felt or experienced fear?
• What led you to feel that emotion?
• How did you handle it?

Say

• Let's learn about success and failure with the help of an activity.

Team Activity

• Divide the class into groups of four.
• Instruct them to think of one scenario where they have to interview a successful entrepreneur.
• Explain the purpose and duration of the activity.
• Set guidelines pertaining to discipline and expected tasks.
• They have to choose one person from the group as the interviewee and one as the interviewer.
• Go around and make sure they have understood what is to be done and are discussing the roles properly.
• Check that everyone understands their role. Give clarifications if needed. Give the participants about 5 minutes to discuss and decide their roles.
• Ask the groups to stop the discussion as soon as the time is over.
• Invite each group one by one to come and present their interview as a role play.

Notes for Facilitator

Facilitating Role Plays

Preparing for the activity

1. Carefully review the details of the scenario and the character descriptions.
2. Become familiar with the key issues being addressed in the scenario.
3. Study the provided material so that you are ready to address issues related to the situations depicted in the role plays.
4. Anticipate potential questions that might be raised by the participants and be ready to address them.

Conducting the activity

1. Introduce the activity. Emphasize that role playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
2. Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.
3. Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.

4. To maintain spontaneity of the interactions during the role play, ask the participants not to discuss the details of their roles prior to the role play.

5. Give the pairs 15-20 minutes to conduct the role play.

6. Circulate among the groups to answer any questions that may arise and provide guidance as needed.

7. After all the pairs have finished with the role play, conduct a debriefing session on each role play.

8. Ask the groups to take five minutes to talk about what happened during the role play. The groups should discuss the questions given in the debriefing for each role play. Encourage participants to provide constructive criticism during their discussions.

9. Conclude the activity by asking participants to think about whether and how they might use scripted role plays in their real life.

Summary:
- Wrap up the unit after summarizing the key points and answering questions.
Facilitator Guide

UNIT 9.6: Preparing to be an Entrepreneur

Key Learning Outcomes

At the end of this unit, participants will be able to:

1. Discuss how market research is carried out
2. Describe the 4 Ps of marketing
3. Discuss the importance of idea generation
4. Recall basic business terminology
5. Discuss the need for CRM
6. Discuss the benefits of CRM
7. Discuss the need for networking
8. Discuss the benefits of networking
9. Discuss the importance of setting goals
10. Differentiate between short-term, medium-term and long-term goals
11. Discuss how to write a business plan
12. Explain the financial planning process
13. Discuss ways to manage your risk
14. Describe the procedure and formalities for applying for bank finance
15. Discuss how to manage their own enterprise
16. List the important questions that every entrepreneur should ask before starting an enterprise
UNIT 9.6.1: Market Study/ The 4Ps of Marketing

Importance of an IDEA: Understanding Market Research

**Unit Objectives**

At the end of this unit, participants will be able to:

• Discuss how market research is carried out
• Describe the 4Ps of marketing
• Discuss the importance of idea generation

**Resources to be Used**

• Participant Handbook
• Chart papers
• Markers pens
• Blank sheets of paper

**Ask**

• Suppose, you want to open a restaurant, what are the factors you will consider?
• How will you promote your restaurant?

**Example**

• Let’s have a look at this example. Arjun was an MBA working in a company. But he wanted to start a low cost budget hostel for foreign tourists coming to India. He did a lot of market research before starting the project. Based on the information he gathered, he made his business plan. His hostel is now flourishing and he is thinking of expanding to other tourist destinations.

**Say**

• Discuss “Market Study” with the participants. Refer to the Participant Handbook.
• Let’s learn about market study and research with the help of an activity.

**Team Activity**

Market Study

• This is a group activity.
• You want to start your own tuition centre.
• What type of research will you do?
Do
• Instruct the participants that this is group work.
• Divide the class into small groups of 4 or 6.
• Give each group a chart paper.
• Tell the participants that they have to start their own tuition centre.
• Give the participants 10 minutes to discuss and write the research work they need to do.
• Keep a check on the time. Tell the group to wind up quickly if they go beyond the given
  time limit.
• By opening a tuition centre you are offering a service.
• What factors will you keep in mind before opening it?
Say
• Discuss “The 4Ps of Marketing” with the participants as given in the Participant Handbook.
Say
• Let’s learn about the 4Ps of Marketing with the help of an activity.

Team Activity: 4 Ps of Marketing
• This is a group activity.
• You have to sell a pen to four different segments:
  1. Rural villagers
  2. Rural middle class
  3. Urban middle class
  4. Upper end rich people (Niche market)
Keeping the 4Ps of Marketing in mind, what marketing strategy will you design to sell the pen?

Activity Debrief

• Ask each group to present their strategy.
• Encourage other groups to be interactive and ask questions.

Do

• Instruct the participants that this is group work.
• Divide the class into four groups.
• Give each group a chart paper.
• Assign each group an audience for selling the pens:
  1. Rural villagers
  2. Rural middle class
  3. Urban middle class
  4. Upper end rich people

• Tell the participants that they have to design a marketing strategy keeping the 4Ps of Marketing in mind.
• Give the participants 20 minutes to discuss and come up with their strategy.
• Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Activity Debrief

• Ask each group to come forward and give a brief presentation.
• Ask each group what they kept in mind while designing their marketing strategy.
• Encourage other groups to be interactive and ask questions.

Say

• Each entrepreneur has an idea of what he wants to sell. It may be a service or a product.
• Discuss "Importance of an IDEA" as given in the Participant Handbook.

Summarize

• Summarize the key points of the unit.
• Ask the participants what they learnt from the activities.
• Encourage them to ask if they have any doubts.
Facilitator Guide

UNIT 9.6.2: Business Entity Concepts

Unit Objectives
At the end of this unit, participants will be able to:

• Recall basic business terminology

Resources to Be Used

• Participant Handbook

Let's recall some basic business terminology.

• Discuss the Business Entity Concepts as given in the Participant Handbook.

• Let's learn some basic business terminology by having an activity.

• We will have a quiz today.

Activity

• The activity is a quiz.

Do

• Divide the class in two groups and give a name to each group.

• Explain the rules of the quiz. For each correct answer the group gets 1 mark.

• If the group is unable to answer the question is passed to the next group.

• Explain the purpose and duration of the activity.

• Ask the questions of the quiz.

• Keep a score of the groups.

• Set guidelines pertaining to discipline and expected tasks.

Summarize

• Summarize the unit by discussing the key points.

Notes for Facilitator

QUESTIONS FOR THE QUIZ

1. What does B2B mean?
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2. What is a financial report? A comprehensive account of a business' transactions and expenses.

3. Who is a sales prospect? A potential customer.

4. How is working capital calculated? Current assets minus current liabilities.

5. What is an asset of the overall worth of a business called? Value.

6. You are buying a house. What type of transaction is it? Complete exchange transaction.

7. How will you calculate the net income? Revenue minus expenses.

8. How is Return on Investment expressed? As per centage.


10. What is revenue? Total amount of income before expenses are subtracted.

11. What is a Break-Even Point? This is the point at which the company will not make a profit or a loss. The total costs and total revenues are equal.

12. What is the formula used to calculate simple interest? \[ A = P(1 + rt); \] \[ R = r \times 100 \]

13. What are the three types of business transactions? Simple, Complete and Ongoing Transactions.

14. The decreasing value of an asset over time is known as Depreciation.

15. What are the two main types of capital? Debt and Equity.
UNIT 9.6.3: CRM & Networking

Unit Objectives

At the end of this unit, participants will be able to:

• Discuss the need for CRM
• Discuss the benefits of CRM
• Discuss the need for networking
• Discuss the benefits of networking

Resources to be Used

• Participant Handbook

Ask

• Can your business run without customers/buyers?
• Who is the most important entity in any business?

Say

• The key to every successful business lies on understanding the customer's expectations and providing excellent customer service.
• Discuss about CRM and its benefits. Refer to the Participant Handbook.
• Providing excellent customer service entails:
  o Treating your customers with respect.
  o Being available as per their needs/schedule.
  o Handling complaints effectively.
  o Building long lasting relationships.
  o Collecting regular feedback.

• Handle customer complaints proactively. Ask “what happened”, “why it happened”, “how can it be avoided next time”, etc.
• Collecting feedback from customers regularly will enable you to improve your good/service.
• “Let’s understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyze the case scenario that has been given to you and then find an appropriate solution to the problem.”

Do

• Divide the class into four groups of maximum six participants depending on the batch size.
• Give one case study to each group.
Instruct them to read the case carefully.

The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.

Put down the discussion points (de-brief questions) on the board. Give the class 5-10 minutes to discuss the case and note down their solutions.

At the end of 10 minutes, the team should present their case solution to the class.

**Team Activity**

**Case Study Analysis**

Raju runs a business of wooden furniture. He has a huge list of customers on Facebook and WhatsApp who give him orders regularly. Ankita is one of his old and regular customers. She placed an order for a new chester and TV cabinet via WhatsApp and requested Raju to send them as soon as possible. When the parcel reached Ankita through courier she found that chester was broken and the TV unit was chipped from the boom. Ankita was heartbroken. It was a complete waste of money. She sent a message to Raju on WhatsApp, expressing her anger and disappointment. Raju might lose an old customer forever if he doesn't satisfy the customer. What should Raju do to retain his customer?

**Scenario 2**

Rajni runs a bouquet shop. She sells suits and sarees. She is one of the most successful designer in her city. Rajni swears that all the clothes in her bouquet have unique designs.

Smita has to attend her cousin's wedding; she goes to Rajni's bouquet to buy a saree. Smita wanted a unique designer saree. Rajni customized a saree for her and sent it over the courier.

When Smita had a look at the saree she realised her two friends had the same design sarees. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment. Did Rajni make a false promise? Were her designs copied? What could happen to Rajni's image after this incident? What would you do if you were in Rajni's place?

**Scenario 3**

Shama is a beautician who offers parlour services to ladies by making home visits. Recently, Shama got her name registered on an e-commerce website. Two days earlier, she got a message from Mrs Sushma. The appointment was fixed for next day, 11:00 am and the remuneration for the services was decided beforehand. When Shama reached there at 10:50 am, Mrs Sushma was not at home. When Shama called her, she asked her to wait for a while.

Mrs Sushma reached home at 11:45 am. Meanwhile, Shama had to reschedule her next appointment. After availing Shama's services, Mrs Sushma refused to pay the requisite amount and started finding faults in the services provided by her. Who was at fault in this scenario? What should you do in case the customer behaves unreasonably? What would you do if you were in Shama's place?
Shailender is the manager of a car showroom. He proactively takes part in all the transactions that happen in his showroom. Vinita wants to buy a new car. She has chosen a car from Shailender's showroom. The salesperson has given her a very good discount and has also promised free service for one year. Vinita goes to the showroom and asks to complete all the formalities to purchase the car. When she sees the final bill she realizes that she has not received the promised discount neither was there any mention of the free services. She immediately demands to see Shailender. When Shailender's head asks how much discount Vinita was promised, he realized the discount will make the sale in loss. The car showroom owner might lose a customer and deal due to false commitments made by his manager. Besides, the customer might tell this to other people, creating a bad name and image for the showroom.

If you owned that showroom, how would you have convinced your customer?

Say

1. Now, let's discuss the problem and solution with the class.
2. The group will first briefly describe the case to the class.
3. Then discuss the issue identified and the proposed solution.
4. Present the solution as a role play.
5. Post presentation, the other groups may ask questions from the group that has presented.
6. Congratulate each group for the presentation/role play.
7. Ask the audience to applaud for them.
8. Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

Say

If your customers are happy with you they will give referrals which will help to grow your business.

One more way of growing business is 'Networking'.

Discuss Networking and its benefits. Refer to the Participant Handbook.

Activity

Group Discussion

Conduct a group discussion in the class on how they can do networking for their business.
• Ask the participants what they have learnt from this exercise/activity.
• Ask if they have any questions related to what they have talked about so far.
• Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.
## Unit Objectives

At the end of this unit, participants will be able to:

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term, and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

## Resources to be Used

- Participant Handbook
- Chart papers
- Blank papers
- Marker pens
- Ruler

### Ask

- Remember we had written SMART Goals in a previous session? Let’s try and recall why it is important to set goals?

- While framing SMART goals, we talked about ‘T’ in SMART, which was ‘Time Bound’. What do we mean by ‘time bound’ goals?

- What limit did you set for your goal: 3 weeks, 3 years, 10 years?

### Say

- Talk about short-term, medium-term, and long-term goals, as discussed in the Participant Handbook.

### Ask

- As you are planning to become an entrepreneur, you must have thought of an idea for a start-up. What is your business idea?

### Do

- Ask few participants to share their business ideas.
Have you created a business plan for your business idea?

Do you think it is important to have a business plan in place? Why/why not?

Talk about 'Why Create a Business Plan' as discussed in the Participant Handbook.

Let's understand it better with the help of an activity.

Team Activity: Wiring a Business Plan

This is a group activity.

Give the groups the required resources such as chart paper and markers.

This activity is divided into two parts:
1. Create a business idea
2. Develop a business plan

The group will discuss and come up with a new business idea and present their idea to the class.

In the second part of the activity, the group will develop a business plan for the business idea.

The business plan prepared will be presented by the groups to the class.

MY BUSINESS PLAN

Executive Summary: Why is your mission statement?

Business Description: What is the nature of your business?

Market Analysis: What is your target market?

Organizational and Management: What is your company's organizational structure?

Service or Product Line: What is the lifecycle of your product/service?

Marketing and Sales: How will you advertise and sell your products?

Funding Request: How much funding is required and from where?
Facilitator Guide

• Teams will need to brainstorm for this part of the activity.
• Use the blank papers for the second part of this activity.
• Make your business plan on a chart paper based on the following parameters:
  1. Executive Summary
  2. Business Description
  3. Market Analysis
  4. Organization and Management
  5. Service or Product Line
  6. Marketing and Sales
• Explain each parameter in detail as done in the Participant Handbook.
• Discuss each parameter with the business idea examples of the groups.
• Groups will discuss and develop the business plan for their business idea.

Now, let's share our plan with the class.
• Each group will briefly describe the plan to the class.
• Post presentation, the other groups may ask questions to the group who have presented their plan.

Congratulate each group for sharing their points.
• Ask the audience to applaud for them.
• Keep a check on me. Tell group to wind up the discussion quickly if they go beyond the given time.

Along with a business plan, you need to create a financial plan and evaluate the risk involved with your start-up.
• Discuss ‘Financial Planning’ and ‘Risk Management’ in detail as given in the Participant Handbook.

Ask the participants what they have learnt from this exercise/activity.
• Ask if they have any questions related to what they have talked about so far.
At the end of this unit, participants will be able to:

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

**Resources to be Used**

- Participant Handbook
- Bank loan/finance form sample

**Ask**

- While preparing a business plan in the last session, we discussed financial planning to arrange financial resources for your startup. Therefore, how will you collect funds to start your business?

**Say**

- While most entrepreneurs think 'product' is the most difficult thing to decide for a business, startup capital poses an even bigger obstacle. Though there are various ways of funding the business, to convince investors to invest money is the most challenging.

- Some of the funding options available in India are:
  - Bootstrapping: Also called self-financing is the easiest way of financing
  - Crowdfunding: Funds collected by consumers pre-ordering or donating for starting the business.
  - Angel investors: Individual or group of investors investing in the company.
  - Venture capitalists: Venture capitalists are professionally managed funds who invest in companies at which they believe potential. They usually invest in a business again in equity.
  - Bank loans: The most popular method in India.
  - Microfinance providers NBFCs or Government programs

- Let us know discuss the most popular method i.e., bank finance in detail here.
Facilitator Guide

Do

• Discuss the list of documents that are required to apply for a loan like letter of introduction, business brochure, references of other banks, and financial statements.

• Explain the details to be filled in a loan application form.

• Divide the class into groups. Give each group a loan application form.

• Ask the groups to discuss and fill the form.

• Close the discussion by summarizing the important documents needed for bank loan.

• Ask the participants if they have any questions related to what they have talked about so far.

Notes for Facilitator

• Checklist of documents is provided as resources for the session.

• You can make some copies and distribute it during the group activity.

• Download sample loan application forms from any nationalized bank's website. Print sufficient copies to circulate it amongst the groups.

1. Audited financial statements of the business concern for the last three years
2. Provisional financial statements for the half-year ended on...
3. Audited financial statements of associate concerns for the last three years
4. Copy of QIS II for the previous quarter ended on...
5. Operational details in Annual Report
6. CMA data for the last three years, estimates for current year and projection for the next year
7. Term loan/DEQ entitlements in Annual Report II
8. List of machinery in respect of machinery offered as security in Annual Report III
9. Additional details for export advances furnished in Annual Report IV
10. Property statements of all directors/partners/proprietor/guarantor for...
11. Copies of ITA of the company for the last three years
12. Copies of ITAOs/WTAOs of the directors/partners/proprietor and guarantor
13. Copies of certificate from banks and financial institutions certifying the last liability with...
14. Copy of board resolution authorizing the company to apply to your bank for credit facilities mentioned in application.
15. Copy of memo and arc of association (in case of limited company/partnership deed (in case of partnership firm))

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</table>

16. Cash budget for the current year and next year in case of contract or seasonal industries.
Facilitator Guide
UNIT 9.6.6: Enterprise Management – An Overview: How to Manage Your Enterprise?

Unit Objectives
At the end of this unit, participants will be able to:
• Discuss how to manage their own enterprise

Resources to be Used
• Participant Handbook

Ask
• Having set up a business, do you think it is possible to do everything on your own?
• Does one require trained persons for help?
• What does management mean?

Say
• Let’s have a look at this example:
Kapil had a small business that was beginning to pick up pace. He wanted to expand his business, and therefore employed a few more people. One day, as he was walking past Ramesh, one of his new employees, he overheard Ramesh talking rudely to a customer on the phone. This set him thinking. Kapil realised that he should have regular team meetings to motivate his employees and speak with them about any problems they might be facing during work.
He should also conduct training sessions on new practices, skills, and technology, and develop work ethics.

Say
• Was Kapil correct in his approach or he should have scolded Ramesh instantly in front of his other employees?
• Discuss “Enterprise Management – An Overview” with the participants as given in the Participant Handbook.

Say
• Let’s learn how to effectively manage an enterprise or business through an activity.
Team Activity

Enterprise Management

- This is a group activity.
- Design a matrix listing the topics and key words that are needed to run an enterprise effectively and smoothly.

Activity Description

- Have each group present their matrix.
- Encourage participants of the other groups to ask questions about each other’s presentation.

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper and coloured pens.
- Tell the participants that they have to make a matrix they need to fill.
- They have to write the main topics and key words that will help them effectively manage their enterprise.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summary

- Ask the participants what they have learned from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of effective management to run an enterprise as given in the Participant Handbook.
UNIT 9.6.7: 20 Questions to Ask Yourself before Considering Entrepreneurship

At the end of this unit, participants will be able to:

• List the important questions that every entrepreneur should ask before starting an enterprise

Resources to be Used

• Participant Handbook
• Blank sheets of paper
• Pens

Ask

• Why do you want to become an entrepreneur?

Say

• It is very important to know why you want to become an entrepreneur. Your personal goals for becoming an entrepreneur play a key role in the success of your business. Your goals should be clear well before you start your business.

• Apart from the goals, the other aspects of business that you need to bear in mind are the potential problems that you may face to set up, your areas of interest, and all the other dimensions of the business.

• Let’s understand it better with the help of some questions that every entrepreneur should ask before starting their own business.

• Open the Participant Handbook section named ‘20 Questions to Ask Yourself Before Considering Entrepreneurship’. You have to answer the questions individually.

• Then, we will have a class discussion on all the questions.

Do

• Read out the questions one by one in front of all the participants.
• Participants have to answer all the questions one by one.
• Give the class 10-15 minutes to note down their answers.
• At the end of 15 minutes, open the discussion for all the questions.
• Moderate the discussion by focusing on the relevant points.
• Keep a check on me and don’t let the discussion get sidetracked or lose track of me.

Ensure all the questions are covered and discussed.

• Give the participants 15 minutes to discuss and write.

• Keep a check on me. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize:

• Ask the participants what they have learned from this exercise/ activity.

• Ask if they have any questions related to what they have talked about so far.
Training Delivery Plan

Program Name: Certificate Course in Wireman Control Panel

Qualification Pack Name & Ref. ID: Wireman Control Panel (ELE/Q7302)

Version No.: V1.0

Version Update Date: 14-03-2015

Minimum Educational Qualification: 10th standard passed

Maximum Educational Qualification: ITI/Diploma (Electronics/Electrical)

Training Outcomes:

By the end of this program, the participants will be able to:

1. Understand the work requirement
2. Wire the control panel
3. Report to supervisor
4. Interact with supervisor or colleague
5. Follow safety measures and standards
6. Achieve productivity, quality and safety standards
7. Maintain good health and posture
8. Complete the documentation
Basics of Electrical & Electronics.

- Understand concepts of Current, Voltage, Power Factor & Power, Ohms Law / Kirchhoff's laws
- Understand AC & DC Current & Voltage.
- Concept of Line & Neutral, Concept of 1-ph (L-N) & 3-ph (RYB-N)
- Understand use of Diodes, Triodes, Transistors, Resistors, Capacitors, Inductors, LEDs, Thermistors etc
- Understand use of Push Buttons, Indicating Lamps, Selector/Key Switches
- Understand Concept of Relays and Contactors (NO/NC)
- Understand use of Power Supplies, Earthing & Grounding
- Understand use of Shielded &
Facilitator Guide

Unshielded Cables, Cable Gauges & AWG sizes IS standards for Colour Codes & Application

- Understand Electrical Circuits (Series / Parallel)
- Understand Daisy Chain & Point to Point Networking Using Star & Delta Connections, Bus Bars, Line cho
- Wiring Drawings of Control Panels AutoCAD drawings
- Read AutoCAD drawings of Wiring
- Understand basic AutoCAD Commands
- 6hrs

Electrical Safety
- Use of Rubber soled Shoes, Gloves and Goggles
- 7hrs

Facilitator - led Discussion Videos, PPT's, Laptop, Projector, Projector Screen, White Board
<table>
<thead>
<tr>
<th>Wiring a Control Panel</th>
<th>Steps of Wiring a Control Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Determine BOQ of Components</td>
</tr>
<tr>
<td></td>
<td>• Check received material for</td>
</tr>
<tr>
<td></td>
<td>specificas as per drawing.</td>
</tr>
<tr>
<td></td>
<td>• Create Channel layout</td>
</tr>
<tr>
<td></td>
<td>• Select the correct Conductor</td>
</tr>
<tr>
<td></td>
<td>• Test for Shorts / Continuity</td>
</tr>
<tr>
<td></td>
<td>• Cut required lengths</td>
</tr>
<tr>
<td></td>
<td>• Use Ferrules &amp; Cable lugs</td>
</tr>
</tbody>
</table>

**Tools & Equipment**

- Use of tools and equipment
- Understand the use of Multi-meter for Current, voltage (AC/DC), Resistance & Continuity measurements
- Understand the use of tester, Tong-Tester, Pliers and Wire stripper, Screw Driver Set (All terminal types)
- Understand the use of Allen Key Set, Power Drill (Drill bits)
- Understand the use of Insulation Tape, Wire Lugs, soldering Iron
- Understand the use of Megger, Wrenches, Hammer, Wire bender and a Ladder

**Facilitator-led Discussion**

- Presentation of Videos, PPT’s, Laptop, Projector, Projector Screen, White Board

**5 hrs**
<table>
<thead>
<tr>
<th>Facilitator Guide</th>
<th>Terminal</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Check the circuits</td>
<td>• Dress the Cables</td>
<td>• Use Cable Glands (Single Compression / Double Compression)</td>
</tr>
</tbody>
</table>

### Identifying Faulty Components
- Test Power Supply
- Test CT/PT
- Testing Relays & Contactors
- Test Pushbutton, Indicator Lamps & Selector Switches
- Test Voltmeter, Ammeter & Energy Meter
- Troubleshoot of Control Panels

### Fundamentals of Motors, Generators & Starters
- Basics of motors and starters
  - Understand working of Motors and Generators
  - Slip ring Induction Motor
  - Squirrel Cage Induction Motor
  - DOL Starter
  - Star / Delta Starter

### Basics of AC Drives & Starters
- Working of starters
  - Understand Components of an AC Drive System
  - Types of VFD Control Terminal
  - Wiring for I/Os
- Components of a Starter
  - Types of Starter Control Terminal
  - Wiring for I/Os

### Additional Resources
- Demonstrations Videos, PPT’s, Laptop, Projector, Projector Screen, White Board

### Duration
- 7 hrs
- 8 hrs
- 4 hrs
- 6 hrs
- 2 hrs
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELE/N7302</td>
<td>SA1, SA2, SA3, SA4, SA5, SA6</td>
<td>6 hrs</td>
<td></td>
</tr>
<tr>
<td>ELE/N9962</td>
<td>PC1, PC3, PC5, PC7, PC14, PC15, KA2, KA3, KB1, KB2, SB1, SB2</td>
<td>6 hrs</td>
<td></td>
</tr>
</tbody>
</table>

- **Wireman Control Panel**
- **Professional Skills**
  - Reading skills
  - Preparing and reading Job sheets
  - Preparing indents, invoices and Maintenance logs
  - Using MS Excel & MS Word for record keeping
  - Preparing As-built documentation, Ferrule list
  - Sharing and delegating tasks
  - Preparing Task reports
  - Facilitator-led discussion, demonstration
  - Preparing minutes of meetings
  - Managing team members
  - Managing time targets & commitments to customers
  - Preparing faulty parts report
  - Understanding Material Workflow (stores to production)
  - Writing e-mails
  - Understanding Principles of 5S & Kaizen

- **ELE/N7302**
  - Task: SA1, SA2, SA3, SA4, SA5, SA6
  - Duration: 6 hrs

- **ELE/N9962**
  - Task: PC1, PC3, PC5, PC7, PC14, PC15, KA2, KA3, KB1, KB2, SB1, SB2
  - Duration: 6 hrs
Facilitator Guide

Workplace Health & Safety

- Understand Safety Policy
- Use of Fire & Hazardous chemical handling
- Incident Reporting
- Use of Fire Extinguishers A, B, C, ABC
- Understand ESD Procedures for handling electronic components
- Use of Safety Helmets, Ear plugs, Shoes, Gloves, goggles & Safety harnesses.
- Use of First aid for Electrical Shock & Burn
- Understand Fire Drills & Evacuation procedures
- Use of helmet & Respect for Traffic rules
- Understand Health Policy

- Posture, exercise & diet

Facilitator-led Discussion

Demonstration Videos, PPT's, Laptop, Projector, Projector Screen, White Board

3 hrs
CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for "Wireman – Control Panel" Job Role

Qualification Pack: ELE/Q 7302

Sector Skill Council: Electronics Sector Skills Council of India

Guidelines for Assessment:

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportional of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/training centre.

4. SSC will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.

5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS.

6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

7. In case of unsuccessful completion, the trainee may seek reassessment on the qualification pack.

---

Marks Allocation:

<table>
<thead>
<tr>
<th>Element</th>
<th>Performance Criteria</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELE/N7302 Wire control panel</td>
<td>Interacting with customer prior to visit</td>
<td>(300)</td>
</tr>
<tr>
<td></td>
<td>PC1. interact with the supervisor in order to understand the production schedule</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PC2. plan the day’s production activities based on the supervisor’s instructions</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PC3. use wiring drawings, job instructions or work manuals</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PC4. check availability of materials required for wiring</td>
<td>4</td>
</tr>
</tbody>
</table>

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A11e112 e3,3'5',e5'4'

<table>
<thead>
<tr>
<th>032 03,3 A</th>
<th>3,5'4' A</th>
<th>034,1 A</th>
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<tbody>
<tr>
<td>035 03,3 A</td>
<td>3,5'4' A</td>
<td>034,1 A</td>
</tr>
<tr>
<td>036 03,3 A</td>
<td>3,5'4' A</td>
<td>034,1 A</td>
</tr>
<tr>
<td>037 03,3 A</td>
<td>3,5'4' A</td>
<td>034,1 A</td>
</tr>
<tr>
<td>038 03,3 A</td>
<td>3,5'4' A</td>
<td>034,1 A</td>
</tr>
</tbody>
</table>
### 6. Wiring the Control Panel

1. **PC5.** Collect wire or cables to carry out the wiring process.
2. **PC6.** Ensure that the panel is positioned as prescribed, following safety norms.
3. **PC7.** Ensure that tools and equipment used in the wiring process are in safe and usable condition.
4. **PC8.** Install the feeder pipe in the panel.
5. **PC9.** Pull the feeder wires into the panel through the feeder pipe installed.
6. **PC10.** Ensure that there is enough wire to get to the opposite end of the control panel.
7. **PC11.** Connect the neutral wire to the neutral bus of the panel.
8. **PC12.** Strip the wire just enough before making any connections.
9. **PC13.** Follow the wiring diagram in order to install the branch circuit wires.
10. **PC14.** Ensure that the outer sheathing is stripped in order to expose the conductor.
11. **PC15.** Connect all the bare copper wires to the ground bus.
12. **PC16.** Make sure that wires used for installation are of appropriate size.
13. **PC17.** Use the wiring diagram accurately to meet the specific needs.
14. **PC18.** Ensure that approved components or modules are available in good condition.
15. **PC19.** Bend the wires so that the wiring has a neat appearance.
16. **PC20.** Follow applicable local electrical codes and standards.
17. **PC21.** Return all tools and equipment to stores at the end of each day’s activities.
Achieving productivity, quality and safety standards

PC25. achieve 100% work schedule as planned for the day
PC26. meet 100% daily or monthly target
PC27. achieve zero errors in assembling as per company policy
PC28. achieve zero component damage
PC29. check any repetitive defects during the assembly process
PC30. keep work area clean and organized
PC31. identify problems on the assembly line and alert in management
PC32. achieve 100% compliance with health and safety guidelines and rules

TOTAL 100

ELE/N9962 Interact with coworkers

PC1. understand work requirements, targets and instructions
PC2. learn about new product models, their features and functions
PC3. report problems identified in the field
PC4. escalate customer concerns that cannot be handled on field
PC5. resolve personnel issues
PC6. receive feedback on work standards and customer satisfaction
PC7. communicate any potential hazards at a particular location
<table>
<thead>
<tr>
<th>PC8. meet given targets</th>
<th>PC9. deliver work of expected quality despite constraints</th>
<th>PC10. have feedback from a happy and satisfied customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>

<table>
<thead>
<tr>
<th>PC11. resolve inter-personnel conflicts and achieve smooth workflow</th>
<th>PC12. receive spares from tool room or stores</th>
<th>PC13. deposit faulty modules and tools to stores</th>
<th>PC14. pass on customer complaints to colleagues in a respective geographical area</th>
<th>PC15. assist colleagues with resolving field problems</th>
<th>PC16. share knowledge and experience gained through everyday work</th>
<th>PC17. clearly demarcate roles of each team member</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

**TOTAL** 100 40 60

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**ELE/N9963 Follow safety standards**

<table>
<thead>
<tr>
<th>PC1. comply with general safety procedures followed in the company</th>
<th>PC2. follow standard safety procedures while handling equipment, hazardous material or tool</th>
<th>PC3. remove rings or any other metal objects before working on the unit</th>
<th>PC4. use of safety materials such as goggles, gloves, earplugs, caps, ESD pins, covers, shoes, etc.</th>
<th>PC5. escalate about any hazardous materials or things found in the premises</th>
<th>PC6. report about any breach of safety procedure in the company</th>
<th>PC7. ensure zero accidents at work</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 6 3</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>4</td>
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</table>

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**TOTAL** 100 6 3
PC9. regularly participate in fire drills or other safety related workshops organized by the company.

PC10. ensure no loss for company due to safety negligence.

PC11. maintain appropriate posture, especially in long hours of sitting or standing.

PC12. participate in company organized health sessions such as yoga, physiotherapy or games.

PC13. handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders.

TOTAL 100
Do
• Explain each Guideline for Assessment in detail
• Explain the score that each trainee needs to obtain
• Recapitulate each NOS one by one and take participants through the allocation of marks for Theory and Skills Practical.

• Explain the Allocation of Marks. Explain that they will be assessed on Theory and Skills Practical.