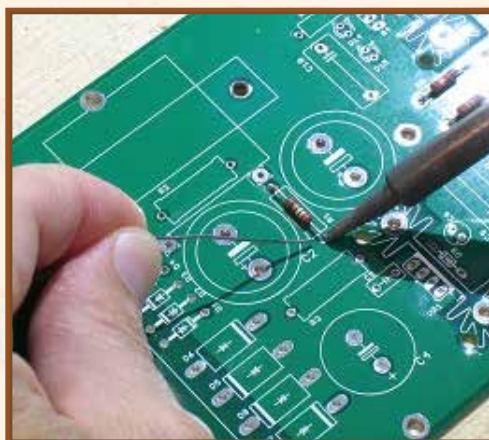




Facilitator Guide



Sector
Iron & Steel

Sub-Sector
Steel, Sponge Iron, Ferro Alloys

Occupation
Electronics & Instrumentation Maintenance

Reference ID: **ISC/Q1101, Version 1.0**
NSQF Level: **3**

Fitter – Electronic Assembly

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Indian Iron & Steel Sector Skill Council
Sector Skill Council Contact Details:
Address: Royal Exchange, 6 N.S. Road, Kolkata - 700 001
Email: info.iisscc@gmail.com
Phone: +91 9831083024

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Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

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for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: 'Fitter - Electronic Assembly' QP No. 'ISC/Q1101 NSQF Level 3'

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About this book

This Facilitator Guide is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s.

This job is all about assembling and wiring up electronic equipment and systems to mechanical equipment. It involves the assembly of the electronic products, inclusive of components, subassemblies, or completed equipment/systems. Along with soldering techniques and anti-static protection techniques assemble with the mechanical equipment.

The candidate should possess basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS. The symbols used in this book are described below.

Symbols Used



Steps



Time



Tips



Notes



Objectives



Do



Ask



Explain



Elaborate



Field Visit



Practical



Lab



Demonstration



Exercise



Team Activity



Facilitation Notes



Learning Outcomes



Say



Resources



Activity



Summary



Role Play



Example

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1. Introduction

Unit 1.1 - Understanding of Iron & steel industry

Unit 1.2 - Understanding various types of Iron & Steel Industry

Unit 1.3 - Creation of products in Iron & Steel industry



Key Learning Outcomes

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

1. Discuss about Iron & Steel industry
2. Discuss about development activities in Iron & Steel industry
3. Discuss about employment opportunities in India
4. Know about industry structure
5. Know about Iron & Steel plants in India
6. Know about steel making procedure
7. Know about processes involve in steel making

UNIT 1.1: Understanding of Iron & Steel Industry

Unit Objectives

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

1. Discuss about Iron & Steel industry
2. Discuss about development activities in the industry
3. Know about opportunities in Iron & Steel Industry in India

Resources to be Used

- Invigilator can use the available objects such as a marker, duster, pen, notebook etc.

Do

- Take a parcel, mention some details such as student name, hobbies, likes, dislikes etc.
- Make the students stand in a circle, close enough to the person each side of them that they can
- Pass the parcel quickly.
- Say 'Stop' when the students least expect it. The person who has the parcel at that time should get out from the class.
- Those who get out should introduce themselves by providing the details mentioned in the parcel.
- The winner of the game should stand and introduce himself/herself at the end of the game.
- At last, say thank the students for their participation.

Say

- India comes under the list of world's largest crude steel producer countries.
- Crude steel capacity of India reached 109.85 Million tonnes (MT), with a growth of 7.4 per cent.
- Requirement of large amount of iron ore and coal for production of steel.
- According to the data, the Indian metallurgical industries attracted Foreign Direct Investments (FDI) of around US\$ 8.7 billion.
- Indian government is aiming to increase steel production to 300 MT by 2025 in the country.

- The Ministry of Steel is facilitating setting up of an industry driven Steel Research and Technology Mission of India (SRTMI) in association with the public and private sector steel companies to spearhead research and development activities in the iron and steel industry at an initial corpus of Rs 200 crore.
- The total employment in the steel industry is more than 2 million which includes both direct and indirect employment.

Notes for Facilitation

- You could ask the students who get out during the game to be the music keepers. They can start and stop the music as the game progresses.
- Encourage shy students to provide information about themselves by prompting them with questions such as 'what do you enjoy doing the most', 'what is your favorite movie or book' etc.
- Brief about iron and steel industry.
- What all conditions for the growth in iron and steel industry.
- Explain the government initiatives in this sector.
- You could ask from the students about employment opportunities in the industry.

UNIT 1.2: Understanding various types of Iron & Steel Industry

Unit Objectives

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

1. Discuss about Iron & Steel industry structure
2. Know about Iron & Steel plants in India

Say

- The Iron and Steel Industry in India is separated into two divisions:
 - o Integrated producers, and
 - o Secondary producers
- TISCO is the oldest iron and steel plant of India.
- There are more than 50 Iron and Steel industries in India.
- Their capacity varying from ten thousand to five lakh tonnes, these are known as mini steel plants.

Notes for Facilitation

- You could ask the students about the expectations from the course.
- Invite students to participate.
- List the major Iron and Steel producing companies in India.
- Give the students a brief overview of what all will be covered in the program.
- You could ask the location of different industries in India.
- You could ask the iron and steel industries name in India.

UNIT 1.3: Creation of products in Iron & Steel Industry

Unit Objectives

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

1. Discuss about steel making process
2. Know about different processes involved in steel making

Say

- Production of steel involves many process steps which can be carried out in different combinations of energy supply, product mix, available raw materials and investment.
- There are many processes involved in steel making like coke making, blast furnace, smelting, reduction etc.
- Coke is produced by heating coking coals up to 1000 to 1200 °C for several hours in coke ovens to drive off volatile compounds and moisture.
- In Basic Oxygen Furnace (BOF)-Blast furnace (BF) route: pig iron is produced by using iron ore (70-100%) and coke in a blast furnace, and then turned into steel in a basic oxygen furnace.
- Smelting reduction unit combine processes for the gasification of coal with the melted iron ore.
- Smelting reduction unit has lower energy intensity than blast furnace

Notes for Facilitation

- You could ask the students the three main steel making procedures.
- Give students some time to think about how the iron and steel industry has changed in the last five years.
- Set the context and describe the industry trends in iron and steel.
- You could ask the entire process involve in steel making.

Field Visit

- You could visit the Iron and steel producing company and demonstrate the procedure of steel making



2. Occupational, Health and safety (OHAS)

Unit 2.1 - Learn Occupational health & Safety

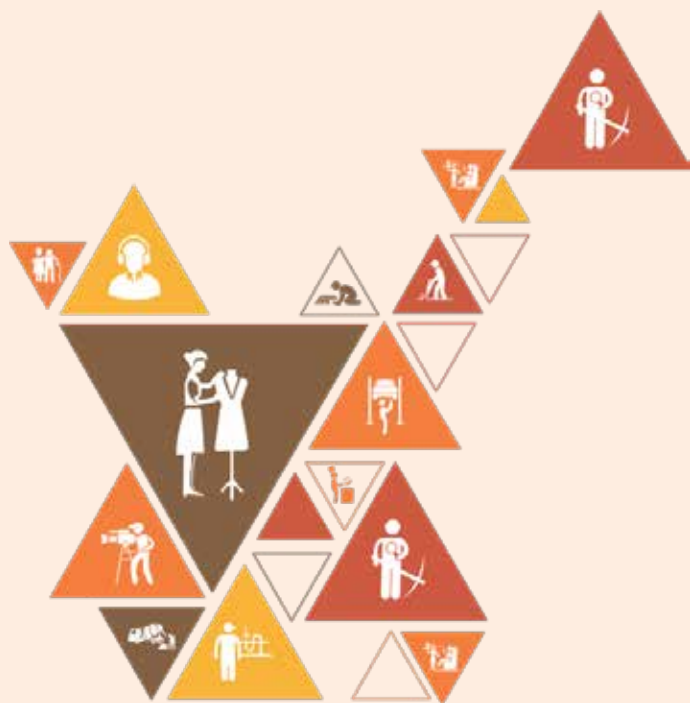
Unit 2.2 - What is hazard

Unit 2.3 - Safe working practices

Unit 2.4 - Working at Heights and confined spaces

Unit 2.5 – Fire prevention

Unit 2.6 - Emergencies, rescue and first aid procedures



ISC/N0008

Key Learning Outcomes

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

1. Discuss about safety requirements, procedures, and resources for different areas
2. Discuss about safe work practices
3. Know about hazards, types of hazards and how to control hazards
4. Know about PPE requirements
5. Know about safe working practices at heights
6. Know about safe working practices at confined spaces
7. Discuss about protection from fire hazards
8. Know about fire extinguisher and how to use it.

UNIT 2.1: Learn Occupational Health & Safety

Unit Objectives

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

1. Discuss about health and safety requirements in industry
2. Know about essential elements for safety
3. Know about good safety work practices

Resources to be Used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts. At last, say thank the students for their participation.

Say

- The health and safety of workers is a very important factor in this industry because it affects both social and economic factors of an organization.
- An iceberg of incidents is showing the nature of various types of accidents. They are unsafe actions, incidents, minor injuries, lost time injuries, serious accidents and fatalities.
- Three features are vital for advancement of safety in a workshop.
- Conducting regular safety audits to identify unsafe practices and areas and how to take corrective actions to overcome the issues. Safety audits can help in timely recognition of hazards and risks.

Elaborate

- Three features are vital for advancement of safety in a workshop:
 - o Situation of environment of work place in terms of plant access, housekeeping, safety and safe place of work etc..
 - o Workers training and ability which assists them to recognize and apply safe systems of work.

- o The development of motivational and behavioral influences of employees. This includes identifying unsafe behavior and attitudes by using more direct strategies and to motivate employees.

Ask



- Ask various type of accident.
- Ask three aspects are important for progress of safety in a steel plant.
- Ask the essential elements necessary for safety
- Ask about the good safety practices

Notes for Facilitation



- You could ask what the students think about safety in steel plant.
- You could ask the benefits to adopt such technique.

UNIT 2.2: What Is Hazard

Unit Objectives

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

1. Discuss about hazards and different types of hazards
2. Know about, how to identify and control hazards
3. Know about safe working practices

Resources to be Used

- Available objects such as a duster, pen, notebook, PPE, heavy weight etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- A hazard is something that has the potential to cause injury, disease or death in a workplace.
- Aspects for the development of a safe workplace environment are development policies, consultative process, hazard identification and control.
- Hazards are of following types: Physical, Mechanical, chemical and Electrical etc.
- Mineral oil is typically used for operation purposes for bulk density control and dust suppression.
- The emissions contain numerous polycyclic aromatic hydrocarbons (PAHs), some of which are carcinogenic.
- Ensure the control measures

Elaborate

There are a number of aspects to the development of a safe workplace environment.

- The development of policies
- The development of consultative processes
- Hazard identification, assessment and control.

A steel plant is full of hazards. For the sake of workers safety in plant, these hazards have to be tackled. Major hazards occur in plant are:

- Road hazards- road hazards are very high because of movement of heavy and heterogeneous traffic on plant. This hazard occurs mainly during the shift change timings of workers.
- Coke oven and sinter plant – Here hazards occur due to dust, heat, chemicals, smoke, fire and explosion etc.
- Blast furnace and steel melting shop – The main hazards occur here due to gas poisoning, heat, slag, dust, moving equipments and vehicles, fire and working at heights.
- Rolling mills – In rolling mills, the hazards occur are moving equipment, heat, suspended loads, splinters and slippery floors.
- Power plant – The main hazards are heat, working at height, noise, vibrations and gas and steam lines etc.
- Material handling – The main hazards occur due to improper material handling are posture, improper signaling, moving equipment, loads and suspended overhead loads etc.
- Other major hazards which are common to most of the places are working in confined space, working with improper tools, poor illumination, poor ventilation, electrical hazards, loco movements, unmanned crossings, unpreparedness for emergencies, unsafe scaffoldings, over confidence and working without safety appliances, personal protective equipments (PPEs), written clearances, and shutdown clearances etc.

Ask

- You can ask the different types of hazard
- You can pick the students and ask the hazard warning sign.
- You can ask the different ideas to control the hazard.
- You could ask the common causes of hazard.

Notes for Facilitation

- You could ask the hazard during workplace.
- You could show all the hazard warning sign and their differences.
- You could ask the various techniques to avoid and control from hazards.
- Give students some time to think about how the hazard affects physical and mentally to our body.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- You could show the various Hazard signs and ask the identification from the students one by one.

UNIT 2.3: Safe Working Practices

Unit Objectives

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

1. Discuss about safe working practices
2. Know about material safe handling
3. Know about personal protective equipments

Resources to be Used

- Available objects such as a duster, pen, notebook, PPE, heavy weight etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- There are safe practices need to be consider for avoiding general shop hazards
- There are safe practices need to be consider for avoiding machine hazards
- Every worker has to lift and move heavy weight during the job whenever required.
- Extreme care should be taken while lifting or moving the job so that no damage occurs to the job or plant and also to prevent accidents at work place.

Elaborate



Personal protective equipment provides us the last level for controlling hazards. Before using of personal protective equipment, the working requirements of the equipment should be checked to make sure it fulfills the same, verify the required standards, make sure it fits the body shape of the user, be user-friendly and is under regular maintenance and can be switched if required.

Personal Protective Equipment (PPE)

- **Safety helmet:** Safety helmets guard the head from injuries caused by falling objects.
- **Earmuffs, earplugs:** Earmuffs and earplugs protect the ears from injuries by loud noises.
- **Safety belt:** Safety harnesses guard from falling from heights.
- **Goggles:** Goggles protect the eyes from injuries caused by strong light or flying objects.
- **Safety boots:** Safety boots guard the feet from puncture wounds, injuries and slipping.
- **Respirator:** Respirators guard the respiratory system from the attack of poisonous gases, mist, fumes and dust.



Fig 2.3.1: PPE

Electrostatic Discharge (ESD)

Fast movement of an electrical charge from one object to another is called ESD. An electrical short or dielectric breakdown is done when there is a sudden flow of electricity if two electrically charged objects come in contact.

Workplace hazards like electrocution, electric shock, fires, burns and explosions are happen due to electricity.

Protection for Electrostatic Discharge Sensitive (ESDS) devices**Work area:**

1. At static-safe workstations it is necessary to handle ESDS devices. This will save yield loss (through catastrophic loss), potential reliability failures in the field or worse.
2. Within 1 meter of a static-safe work bench try to escape bringing sources of static electricity.
3. At least 4m far of all synthetic materials from electronic equipment.
4. A spray labeled is used as a non-static forming when cleaning of printed circuit boards.

Always dress a static wrist strap that's grounded to the frame of the device at the time of troubleshooting of electronic equipment. At the time of handling printed circuit boards always wear the wrist strap.

5. To decrease the buildup of static charges should treat the floors and carpets with compounds.
6. Use static floor mats where essential.
7. Always confirm that the grounding system for equipment has less impedance for ESD currents to dissolve to an earthing orientation.

Personnel:

1. Before unpack the protective container with ESDS devices inside make sure any collected charge on the body of the human operator should be cleared first. By placing a hand on a grounded surface or by trying a grounded antistatic wrist-strap that helps to the discharge.
2. Training and education on ESD protective actions is priceless.
3. An ESD program is also supportive by a regular audit.

Packaging and Transportation:

At the time of storage or transportation the ESDS devices should be carrying in a static defensive bag or container at all times.

Ask

- You can pick the students and ask the safe practices for avoiding general shop hazards.
- You can ask the various types of personal protective equipment.

Notes for Facilitation

- You could ask the safety checklist before operating a machine.
- You could show the protective equipment and ask the causes.
- You could ask the causes of wrong handling

Do



- Show them the PPE
- Demonstrate the use and requirement of PPE
- Demonstrate the safe material handling practices

Demonstrate



Points to be taken care of while lifting / moving material

- Lift the materials in correct posture.
- Do not try to lift too heavy materials alone.
- Ensure the grip is right so that the job doesn't slip from hand and fall
- Put down the job at the destined place properly.
- Do not throw the job on ground.
- Avoid double handling.
- Take rest breaks during heavy or repetitive work.

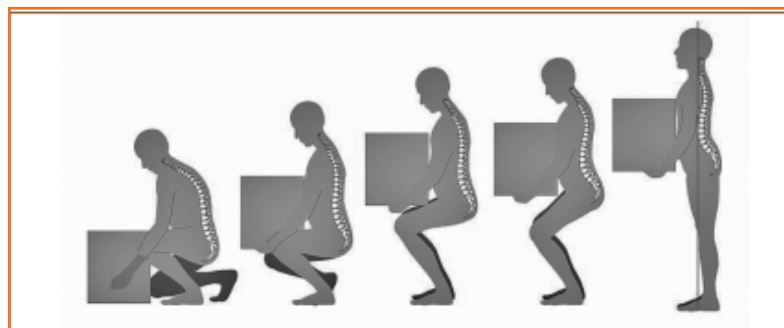


Fig 2.3.2: Safe material lifting

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
PPE and Safe material handling	2 hours	PPE
		Heavy weight

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

Lab

- You could show the various personal protective equipments (PPE) to the students in the lab

UNIT 2.4: Working at heights and confined spaces

Unit Objectives

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

1. Discuss about risks of working at heights
2. Know about safety precautions while working at heights
3. Discuss about risks of working at confined spaces
4. Know about safety precautions while working at confined spaces

Resources to be Used

- Available objects such as a duster, pen, notebook, ladder, respiratory equipments etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students about the understanding of safe working practices at heights and confined spaces.
- Invite students to participate. List the responses from students on the whiteboard.
- Give the students a brief overview of what all will be covered in the program.

2.4.1: Safe working at heights

Say



- Falls from height are responsible for many serious and fatal injuries every year.
- The Health and Safety Executive recommends a five-step approach to risk assessment, and the risk of slips, trips and falls should also be considered.

Elaborate



The main hazards associated with working at height are people falling and objects falling onto people below. These may occur as a result of inadequate edge protection, or from objects in storage being poorly secured.

Safety equipments can use while working at heights:

- Mobile elevated platforms
- Ladders
- Step-ladders
- Scaffolders
- Harnessing belts

Do



- Show the risk assessment procedure
 1. Look for hazards associated with falls from height around the workplace. Where are people required to work at height? Do they carry out work from ladders, platforms, scaffolds, or unprotected or fragile roofs?
 2. Decide who might be harmed and how. Who comes into the workplace? Are they at risk? Are some groups more at risk than others?
 3. Consider the risks. Are there already measures in place to deal with the risks? Look at areas with unguarded openings or without guardrails and covers. Are regular inspections carried out?
 4. Record your findings if you have five or more employees.
 5. Regularly review the assessment. If any significant changes take place, make sure that precautions are still adequate to deal with the risks.
- Demonstrate the safe use of ladders

Demonstrate

Steps of how to work safely on ladder:

1. Climb only the front of the ladder, never the back.
2. Don't climb higher than the tread that's third from the top (there should be two steps above you, including the top); never sit on the top.
3. Keep your hips centered between the vertical side rails; don't overreach to either side.
4. Never stand on the spreaders or paint shelf.
5. Don't leave ladders unattended, especially around children.
6. Allow only one person on the ladder at a time.
7. Never lean a closed stepladder against a wall and climb it; it can slide out from under you.

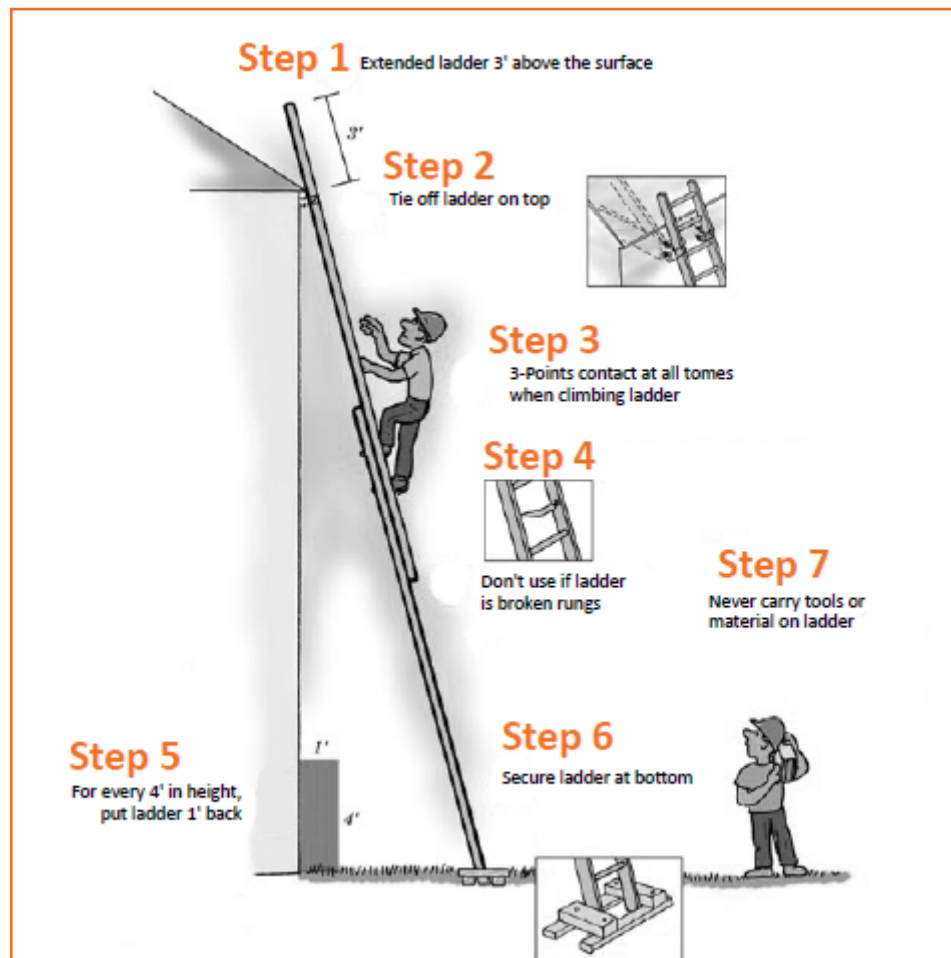


Fig 2.4.1: Safe use of ladder

Do's

- Work on ground level, as much as possible.
- Make sure equipment is sufficiently stable, appropriate and strong for the job.

- When working on or near delicate areas, take safeguards
- Always be prepared for protection from falling objects
- make strategy for evacuation in case of emergency and rescue procedures

Don't



- Overload ladders
- Overreach on ladders or stepladders
- Fix the ladder on weak and uneven surfaces
- Use stepladders or ladders for tough or heavy tasks.

Ask



- You could ask the safe working procedure while working at height.

2.4.2: Safe working at confined spaces

Say



- Spaces which are enclosed from all around and risk of death or serious injury from dangerous conditions and hazardous substances is very high, are known as confined spaces.
- If you cannot avoid entry into a confined space, make sure you have a safe system for working inside the space.

Elaborate



Dangers can arise in confined spaces because of the following issues.

- A lack of oxygen. This can occur:
 - Spaces where reaction between some soils type and oxygen happens in the atmosphere;
 - Reaction of groundwater with limestone produces carbon dioxide;
 - Rust formation inside the vessels and steel tanks.
- Poisonous gas, fume:
 - Formation of poisonous gases in sewers and manholes;
 - Leakage of gases and fumes into trenches and pits in a poisonous area.
 - enter tanks or vessels from connecting pipes;
- Liquids and solids which can suddenly fill the space, or release gases into it, when disturbed. Free-flowing solids such as grain can also partially solidify or 'bridge' in silos, causing blockages which can collapse unexpectedly.
- Fire and explosions due to excess oxygen and flammable vapours.
- Filling of liquids and solids inside the space, when disturbed.
- Hot temperature conditions leading to increase in body temperature dangerously.
- Residues of fumes and vapour left in tanks, vessels etc.
- High concentrations of dust e.g. in flour silos.

Safe systems of work at confined spaces

If you have to work in a confined space, carry safety systems and equipments for working inside the space. The following checklist is important while working in a confined space.

- **Isolation:** Isolate the electrical and mechanical system of equipments need to be operating in space. In any cases, ensure that isolation done is effective.

- **Cleaning:** Make sure that there is no formation of fumes from residues during the work.
- **Size of entrance:** Entrance size is big enough to permit workers to enter in the space with all the necessary equipment required, and provide ready exit during an emergency.
- **Provision of ventilation:** Ensure that there is proper mechanical ventilation for an adequate supply of fresh air in the confined space. It is very important where portable gas cylinders and diesel fuelled equipment are used.
- **Isolation:** Mechanical and electrical isolation of equipment is essential if it could otherwise operate, or be operated, inadvertently. If gas, fume or vapour could enter the confined space, you need to isolate the pipework. In all cases, a check should be made to ensure isolation is effective.
- **Cleaning:** before entry this may be necessary to ensure fumes do not develop from residues etc while the work is done.
- **Check the size of the entrance:** Is it big enough to allow workers wearing all the necessary equipment to climb in and out easily, and provide ready access and exit in an emergency? For example, the size of the opening may mean choosing air-line breathing apparatus in place of self-contained equipment which is more bulky and therefore likely to restrict ready passage.
- **Provision of ventilation:** You may be able to increase the number of openings and therefore improve ventilation. Mechanical ventilation may be needed to make sure there is an adequate supply of fresh air. This is essential where portable gas cylinders and diesel fuelled equipment are used inside the space because of the dangers from build-up of engine exhaust.
- **Provision of special tools and lighting:** Use non-sparking tools and protected lighting systems to avoid flammable and explosive atmospheres. In confined space like inside metal tanks, appropriate precautions are required for safety from electric shock.
- **Provision of breathing apparatus:** Availability of breathing apparatus, if the air inside the space is not adequate and suitable for breathing because of poisonous fumes, gases or vapours in the space and lack of oxygen.
- **Preparation of emergency arrangements:** Proper emergency arrangements which cover the necessary equipments and practice drills.
- **Provision of rescue harnesses:** Availability of safety harnesses at the point outside the confined space.
- **Emergency procedures:** When situations are not favorable, there can be chance of serious and immediate danger. Effective arrangements like alarm systems and rescue operations during an emergency are essential.

Notes for Facilitation

- You could ask about essential elements to help prepare a safe system of work at confined spaces.
- Show them the safety equipments required while working at confined spaces.

Ask

- You could ask the confined space at safe working.
- You could ask how the danger can arise in confined space.
- What can occur if there is lack of oxygen?
- You could ask the isolation process.
- You could ask the safe systems of work at confined spaces.

UNIT 2.5: Fire Prevention

Unit Objectives

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

1. Discuss about fire hazards and how to control
2. Discuss about fire extinguishers
3. Know about types of fire extinguishers
4. Know about how to use fire extinguishers

Resources to be Used

- Available objects such as a duster, pen, notebook, fire extinguisher, fire alarm, PPE etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Fire is defined as a self-sustaining combustion process in which a substance (fuel) combines with oxygen in air to produce immense heat and light.
- Fire hazards pose threats to life and property.
- Fire is categorized into class A, B and C fire.
- A fire extinguisher is a fire protection device used to extinguish or control small fires during fire emergency situations.
- Dry chemical is a powder based. They stops and halts the production of fire supporting by “free-radicals”, accordingly extinguish the fire.

Elaborate

Different fuels create different fires and require different types of fire extinguishing agents.



Class A

Class A fires are fires in ordinary combustibles such as wood, paper, cloth, trash, and Plastics.



Class B

Class B fires are fires in flammable liquids such as gasoline, petroleum oil and paint. Class B fires also include flammable gases such as propane and butane. Class B fires do not include fires involving cooking oils and grease.



Class C

Class C fires are fires involving energized electrical equipment such as motors, transformers, and appliances. Remove the power and the Class C fire becomes one of the other classes of fire.



Class D

Class D fires are fires in combustible metals such as potassium, sodium, aluminum and magnesium.

Common fire extinguishers are:

- **Dry chemical:** These types of fire extinguisher are in powder form. They stop and halt the production of fire supporting by “free-radicals”, accordingly extinguish the fire.
- **Foams:** This type is applied over aspirated or non-aspirated fuels. It forms a seal or foamy blanket over the fuel and stops oxygen to reach near the fuel. Unlike powder type, foam type fire extinguisher is used to extinguish fires without flashback.



Fig 2.5.1: Fire extinguisher

- **Water:** It cools burning material by absorbing heat through the use of air pressurized water. It is successful to extinguish class A fires. Unlike dry chemicals and foams based fire extinguisher it is harmless, inexpensive and easy to clean.
- **Clean agents and carbon dioxide:** These types of extinguisher displace oxygen, control chemical chain reaction and remove heat from fire zone. This extinguisher does not leave any remains after release which is ideal for electronics items and sensitive documents.

Do



- Tell them about the fire fighting equipments.
- Show them the equipments and explain their use.
- Demonstrate them the use of fire extinguisher.
- Explain them about different types of fire extinguishers.

Demonstrate



Steps for using the fire extinguisher



- Step 1: Pull the pin** from the top of the extinguisher for releasing locking mechanism which discharges the extinguisher.
- Step 2: Aim the extinguisher towards** the base of the fire not the flame.
- Step 3: Squeeze the lever slowly.** Deliver the extinguishing agent in the extinguisher. When the lever of extinguisher is released, the discharge of extinguishing agent stops.
- Step 4: Sweep from side to side.** Move the fire extinguisher to and fro by sweeping motion until the fire is under control. Operate the extinguisher from a safe distance. Move towards the fire when it starts to reduce.



Fig 2.5.2: Using fire extinguisher

Notes for Facilitation

- You could ask the common fire extinguisher.
- You could ask the type of fire extinguisher and their role?
- You could ask what all information contains fire drill report.

Tips - During fire outbreak

1. On noticing a fire, immediately start shouting “fire” at top of your voice. Do not wait for the automatic fire alarms to start ringing.
2. Take a fire extinguisher
3. Use extinguisher as per fire type: - Water and co2 fire extinguishers for general fires - Foam type extinguishers for oil fires - Co2 fire extinguisher only for electrical fires.
4. Switch off all main switches during an electrical fire.
5. Do not try to switch off electrical equipment. Cut the power from the main source.
6. do not panic and alert the building fire department
7. Call the fire brigade immediately.
8. Ensure that the water sprinklers and other fire-fighting equipment have started operating.
9. First priority should be to save people. Help others to safely get out of the floor
10. Alert the nearest hospital to prepare to treat serious burn injuries.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Use of fire extinguisher	2 hours	Fire extinguisher
		PPE

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

Field Visit

- You could visit any of the industry and show the firefighting equipment. With the help of field visit you could show the where we need to fit various firefighting equipment and its role.

UNIT 2.6: Emergencies, rescue and first aid procedures

Unit Objectives

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

1. Discuss about basic first aid techniques during electric shock, burns and choking
2. Know about CPR process
3. Know about bandaging process

Say

- If you think someone is suffering from electric shock, approach with extreme caution.

Demonstrate

You can make a group of few students to do demonstrate:

Steps - How to free a person from electrocution

If find someone is suffering from electric shock, approach with extreme caution and following first aid steps.

Step 1: Firstly take the suffered person away from the electricity source as fast as possible. Turning off the electric supply of machine is the best method for doing this.

Step 2: If this seems impossible, remove the person from electricity source by using a piece of wood or insulating material.

Step 3: Don't touch the victim getting the electric shock because you could also get shock too.

Step 4: After successful executing the victim from the electricity source, call the ambulance, if victim is unconscious. Give first-aid to victim till the time ambulance is coming.

Step 5: If victim is conscious and looking well, monitor its condition, as the results of shock must not be clear immediately.



Fig 2.6.1: Freeing a person from electrocution

Bleeding and Wounds



- Step 1:** Cover the wound by a clean cloth and gloved hand; then apply firm and steady pressure on wound for 5 mins at least.
- Step 2:** Lift up the injured leg or arm above the victim's heart level.
- Step 3:** Secure the wound by a bandage when bleeding stops. Ensure that bandage is not fixed too tightly—it may stop blood circulation.
- Step 4:** Check the victim for shock.

Burns



Chemical or Compressed Gas Burns

- Step 1:** Use a drench hose and emergency shower for at least 15 mins to rinse away all residues of chemicals.
- Step 2:** Cover the burn by a clean and dry cloth or special dressing for burns.

Heat or Electrical Burns

- Step 1:** Cool burning of skin by water.
- Step 2:** Place the burned area under cold running water if the skin is not broken and gently compress the wound by hand. Bandage the wound by a dry and clean cloth.
- Step 3:** If blister appear, don't try to break it.
- Step 4:** Do not apply ointments or creams.
- Step 5:** If skin is cracked, or if injuries are severe:
- Do not clean the wound or remove embedded clothing.
 - Cover the injury insecurely with a clean, dry cloth.
 - Expect shock and treat accordingly.

Choking



- Step 1:** Wrap your arms around the stomach and stand directly behind the victim.
- Step 2:** Just above the navel and well below the ribs, make a fist by a hand. Place that fist with the thumb and forefinger side toward you.
- Step 3:** Hold the fist by other hand and pull it rapidly towards you by a slightly upward and inward thrust. If required, repeat it.

Basic techniques of banding

The key points when applying a bandage are:

- Step 1:** Make sure the person is comfortable.
- Step 2:** Never lean across their body and ensure that you are working from the side of the injury.
- Step 3:** First clean the wound and apply the antibacterial cream over it.
- Step 4:** When the bandage is on always remember keep the injured part of the body supported in the position it will be in.
- Step 5:** Always use right size of bandage.
- Step 6:** To check the passage easily, don't cover fingers or toes when bandaging a limb.
- Step 7:** Never wrap the bandage tight, and secure the end by folding it over and binding a knot in the end. Safety pin, adhesive tape, or a bandage clip can be used.

Artificial respiration and the CPR Process

- Step 1:** Check the Victim - tap and shout to get response.
- Step 2:** Circulation - pump the chest 30 times.
- Step 3:** At the center of the chest put the heel of one hand and your other hand on top of it. At a rate of 100 per minute (16 compressions in 10 seconds), press chest down 2 inches.
- Step 4:** Tilt head back, lift chin up to open airway - Airway.
- Step 5:** Breathing - Tweak nose closed, take a normal breath, cover patient mouth with yours and blow out your breath until you see the chest rise. Make one breath per 1 second. Again open airway again if chest doesn't rise.



Fig 2.6.2: CPR Process

- Step 6:** Repeat procedure until help arrives or the victim begins breathing.

Correct method to move injured people during an emergency

- Step 1:** Stand on either side of the conscious victim. Grab the victim's wrist with the hand closest to the victim's feet on your side.
- Step 2:** Use your other hand to grasp the clothing on the shoulder nearest to you and pull the victim's arms to help them to a sitting position.
- Step 3:** Assist the victim to his or her feet and place the arms around your shoulders, if possible.

Step 4: Place your free hand around the person's waist and let him or her set the pace on hobbling out.

Step 5: Help the victim for moving slowly.

Do

- Shock can be life threatening. Symptoms include cold sweat, weakness, irregular breathing, chills, pale or bluish lips and fingernails, rapid weak pulse and nausea.

SHOCK	Do's	Don't
Shock	Take a rest	Do not give the victim anything to eat or drink
Shock	Lay the victim on his/her back	Do not move him/her.
Shock	Keep the victim warm by using the blanket or clothes.	Do not keep the victim hot.
Shock	If the victim not in pain, raise their feet and legs with a pillow.	If victim in pain do not move.

Notes for Facilitation

- You could ask the steps to free a person from electrocution.
- You could ask the steps of bleeding and wounds
- You could ask the steps of burn
- You could ask the steps of choking
- You could ask the steps of banding
- You could ask the steps of CPR

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
First aid practices	3 hours	Mannequin
		First aid box

Do



- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

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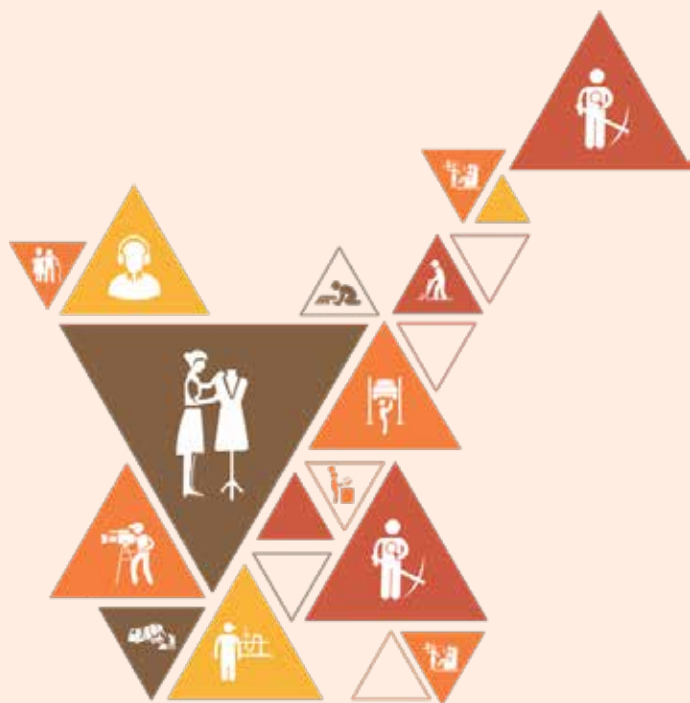


3. 5S & House Keeping

Unit 3.1 – Identification of bottlenecks in functioning of work place

Unit 3.2 - Various methods of housekeeping

Unit 3.3 – Waste management



ISC/N0008

Key Learning Outcomes

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

1. Discuss about safety issues at workplace
2. Know about 5S safety management system
3. Discuss about housekeeping practices
4. Know about benefits of housekeeping
5. Know about elements of effective housekeeping
6. Know about waste management practices

UNIT 3.1: Identification of bottlenecks in functioning of work place

Unit Objectives

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

1. Discuss about safety issues in the industry
2. Know about housekeeping issues in the industry

Resources to be Used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Manufacturing facilities are riddled with risks, both hidden and out in the open. Hazards can result in serious injury or death, if don't know where to begin looking.
- Few of the biggest safety concerns in any manufacturing setting like hearing protection, eye hazards, chemical exposures, mechanical hazards etc
- The Occupational Safety & Health Administration requires companies to provide hearing guard when noise levels surpass specific levels.
- 61 percent of eye damages occur in the manufacturing, construction industries and trade a report by the Vision Council reports.
- In manufacturing, heat and flame can produce by the tools and equipment, which cumulative the risk for fires.
- During the manufacturing process, at many points dust and fumes are generated. Dense fumes released during the use of oxygen can cause lung diseases.

Elaborate



Safety concerns in any manufacturing setting are:

- **Hearing Protection:** Hearing can be affected by noise produced by industrial machines if you are uncovered to the noise on a long basis.
- **Eye Hazards:** 61 percent of eye damages occur in the manufacturing, construction industries and trade a report by the Vision Council reports. Eyes may be injured by dust, metal, concrete and other particles thrown by machines. Eyes can burn or irritate by chemical fumes and splashes.
- **Chemical Exposure:** Some employees in manufacturing units work with hazardous chemicals like workers who produce batteries may be exposed to lead in the form of dust or fumes. This can harm nervous, urinary systems and reproductive with lead exposure linked to failures, seizures, coma and death.
- **Mechanical Hazards:** There are several risks to employees while working with manufacturing machines. Machines that have sprockets, gears, pulleys and rotating shafts pose risks of predicament.
- **Fire Hazards:** In manufacturing, heat and flame can be produced by the tools and equipment, which cumulative the risk for fires. Employees should be aware of where to find fire extinguishers and how to rescue the facility immediately in the event of a serious fire.
- **Carbon monoxide poisoning:** In manufacturing industries, blast furnaces and converters generate huge amount of gases. Once dust has been removed, these gases are used as fuel resources and some are used as raw materials and supplied to chemical plants.
- **Dust and fumes:** During the manufacturing process, at many points dust and fumes are generated. Dense fumes released during the use of oxygen can cause lung diseases. Contact with silica is also a danger for the workers and cause serious infections and injuries.



Fig 3.1.1: Chemicals



Fig 3.1.2: Mechanical hazard



Fig 3.1.3: Dust and fumes

Notes for Facilitation



- You could ask the students safety concern in manufacturing plant.
- Invite students to participate.
- You could ask the students how carbon monoxide poisoning released.
- You could ask the students effects of chemical exposure.

UNIT 3.2: Various methods of Housekeeping

Unit Objectives

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

1. Know about 5S Safety system
2. Discuss about essential elements of housekeeping
3. Know about good housekeeping practices

Say

- 5S is a fundamental, systematic, basic, approach for quality, productivity and safety improvement.
- 5S is created by a list of five Japanese words: seiri, seiton, seiso, seiketsu, and shitsuke.
- Workplaces hazards can be eliminate by effective housekeeping and complete a job safely and properly.
- Poor housekeeping and hiding hazards can cause frequent accidents which can cause injuries.
- Elements of an effective housekeeping program are Dust and Dirt removal, clean surfaces, Maintain light fixtures, aisles and stairways, spills control, waste disposal, storage etc.

Elaborate

5S is created by a list of five Japanese words: seiri, seiton, seiso, seiketsu, and shitsuke. 5S system is implemented for organizing the workplace for increasing effectiveness and efficiency by maintaining the area and items, storing the items used, and sustaining the new practices.

Purposes of conducting regular 5S audits are:

- Evaluation of 5S standards for industry
- To fix what is wrong! - note and address non-compliance
- Give a official chance to suggest improvements

The basic steps of 5S audit are:

- Plan for the audit. Divide the workplace into several areas for successful audit reviews.

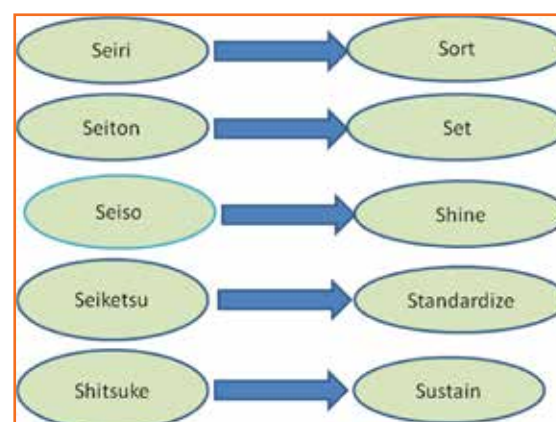


Fig 3.2.1: 5 S terminology

- Based on the standards set during audit, make a list for every area.

Three key tasks has to be done during the audit

1. Find out whether known difficulties have been addressed:
 - Lubricants are still leak from this machine?
 - People are not walking under crane, is the warning sign in place?
 - Why outdated drill press is still in the workshop?
2. Look into the standards is being met:
 - Are tools left on work tables?
 - From the tool rack is something missing?
 - Is dirt collecting anywhere?
 - Are safety labels visible and readable?
3. To be noted that what has not yet been standardized – Most imaginative and hard section, it may include seeing what is missing in an area that seems neat:
 - Why is there no sign over the well-ordered stack of work-in-process materials on that shelf?
 - Tools that are not yet labeled

Housekeeping

Cleanliness doesn't mean housekeeping. Housekeeping includes keeping work areas tidy and arranged; keep floors free of slip and trip accidents; clearing of waste materials (paper, cardboard) and other fire hazards.

Efficient housekeeping results in:

- Decrease handling to comfort the materials flow
- Fewer slipping and tripping accidents
- Less fire hazards
- Hazardous substances e.g. dusts, vapors exposures to lower worker
- Better control of tools and materials in managing inventory and supplies
- Equipment's are more cleaned and well maintained.
- Better hygienic conditions for good health
- Space utilization is more efficient
- Reduced property damage due to improvement in preventive maintenance
- Improved efficiency because it is easy to find tools and materials.

Ask



- You could ask the objectives and advantages of 5S
- You could ask the benefits of good housekeeping practices.
- You could ask the elements of an effective housekeeping program

Notes for Facilitation



- Invite students to participate.
- You could ask about the standards that were set during 5S for make a checklist
- You could ask how housekeeping program make effective.

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Do the 5S audit of your training center and make the 5S Audit form and fill it.

Field Visit



You could visit any of the industry and show the 5S Safety system and check the various points of safety with the help of housekeeping checklist

UNIT 3.3: Waste Management

Unit Objectives

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

1. Discuss about waste management
2. Know about elements of waste management
3. Know about methods of waste management

Say

- Waste management is gathering, transport, recycling, processing and disposal of waste materials. Waste management is carried by recovering resources from waste materials.
- Waste may be classified as garbage, rubbish, industrial wastes, mining wastes etc.
- Industrial waste can be of two types: non-hazardous and hazardous waste.
- Waste management strategy involves legal and proper decomposition of waste.
- Methods of waste management are segregation, composting and burning.

Elaborate

Elements of a waste management strategy

Good waste management practices involve much more than that disposing of waste legally and properly. Strategy for the management of industrial waste can include the subsequent elements:

- Current waste management procedures and primary audit of wastes produced.
- Risk assessment to find that stowage and handling procedures does not possess any health or environmental risk.
- Identification of options for reuse, waste reduction, recovery assessment and recycling of waste.
- Identification of best practicable environment! There should be an option for dumping of waste and residues.
- Selection of the contractor offering the best service and audit of potential waste management contractors.

Waste management methods

1. **Segregation:** Separation of waste using different containers is necessary because plastics, building materials, glass and waste from the site work could take a really long time period to decompose. This is the reason, thus, it is required to maintain green practices so waste management should be done



Fig 3.3.1: Waste segregation

with proper segregation. Thus we make sure to support you in removing hazardous waste from compostable non-hazardous solid waste, organic waste, recyclable materials and other regulated material.

2. **Composting:** This waste management process turns waste into organic compounds that you can use to feed plants. In terms of the environment advantages this is actually beneficial technique. Making use of this method, it's easy to turn unsafe organic products into safe compost.
3. **Burning:** If your approach is not towards disposing materials and other wastes, then burning method will be a good approach for you. If waste is bio-degradable or cannot produce hazardous gases after burning, you can burn the waste.



Fig 3.3.2: Waste Compositing

Ask



- You could ask the elements of waste management strategy
- You could ask from the students' different method of waste management

Field Visit



- You could visit any of the industry and show the waste management system and how they do the segregation of waste.

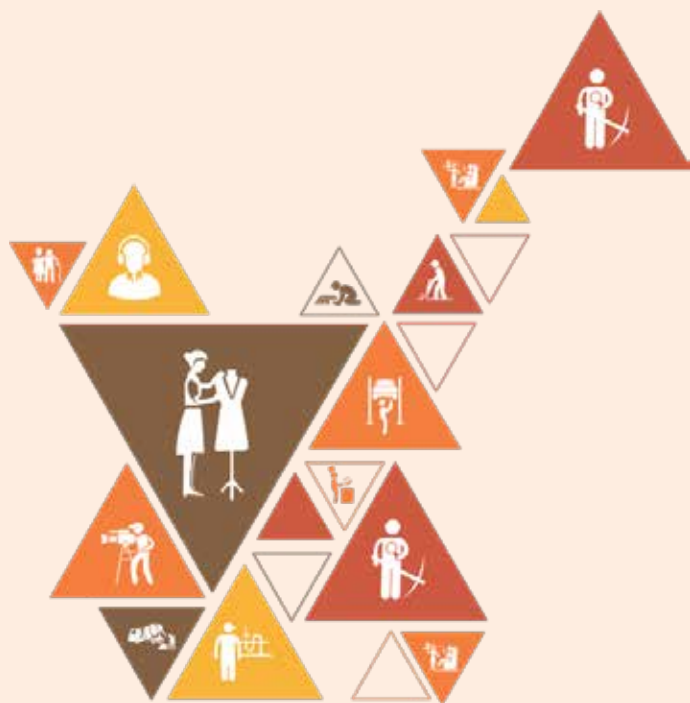
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4. Basic principles of electricity

Unit 4.1 – Electricity fundamentals

Unit 4.2 – Electric circuits and Ohm's law



ISC/N1101

Key Learning Outcomes

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

1. Discuss about basic electric fundamentals
2. Discuss about how electricity generate
3. Discuss about different sources of electricity generation
4. Know about how current flow in the circuit
5. Know about ohm's law
6. Know about electrical circuit
7. Know about different types of electric circuit

UNIT 4.1: Electricity fundamentals

Unit Objectives

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

1. Understanding of electricity and how electricity generate
2. Understanding of conductors, insulators and semiconductors
3. Understanding of how a conductor, conducts electricity
4. Know about different sources of electricity

Resources to be Used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- The most important system today is the electrical system. Electricity is used by more and more components and systems every year.
- It may be hard for some people to know about electricity because of the following reasons.
 - o It cannot be visible.
 - o Output of electricity can be visible.
 - o It has to be spotted and calculate.
 - o The test results have to be interpreted.
- Movement of electrons from one atom to another is called electricity.
- Materials can be classified into three types based on their ability of conducting electricity – Conductors, insulators and semiconductors.
- A flow of electric charge is known as an electric current. This charge is often carried by moving electrons in a wire in electric circuits.
- Ampere is the SI unit for calculating an electric current.
- Electricity can generate from the following sources: Friction, heat, light, magnetism etc.

Elaborate



Movement of electrons from one atom to another is called electricity. Nucleus is defined by the dense centre of each atom.

The nucleus covers:

- *Protons , have positive charge*
- *Neutrons , electrically neutral (have no charge)*

Electrons are moving around the nucleus in orbits and carries negative charge. An equivalent number of electrons and protons are available in each atom. Type of material and how electricity is conducted can be determined by the no. electrons and protons in the atom.

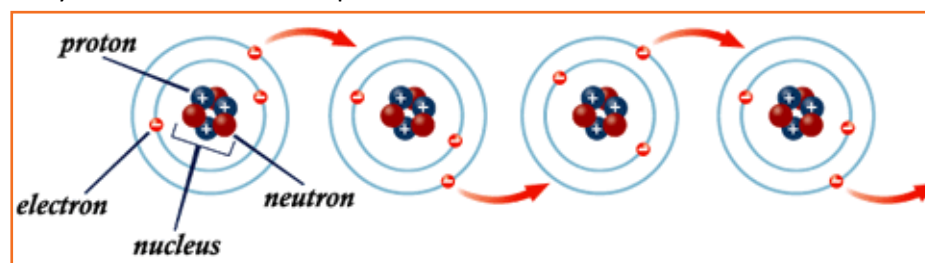


Fig 4.1.1: Movement of atoms in nucleus

Conductors, semiconductors and insulators

Conductors: The materials that allow the flow of electrical current in one or more directions is known as conductor. A common electrical conductor is metal wire. Commonly used conductors include:

- Silver
- Aluminium
- Gold
- Cast iron
- Steel



Fig 4.1.2: Conductor

Insulators: It is a material whose interior electric charges doesn't flows easily, and therefore make it almost impossible to conduct an electric current under the influence of an electric field. Examples of insulators include:

- Rubber
- Nylon
- Plastic
- Porcelain
- Fibreglass
- Ceramic

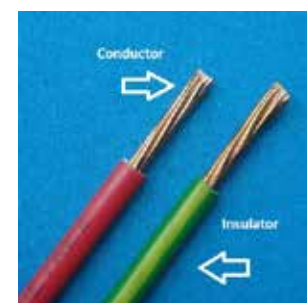


Fig 4.1.3: Insulator

Semiconductors: These are hard chemical element or compound which can conduct electricity under some specific situations, this characteristic makes it a nice source for the control of electrical current.

Examples of semiconductors:

- Silicon
- Carbon
- Germanium

Mostly use of semiconductors is in transistors, computers, and other electronic devices.

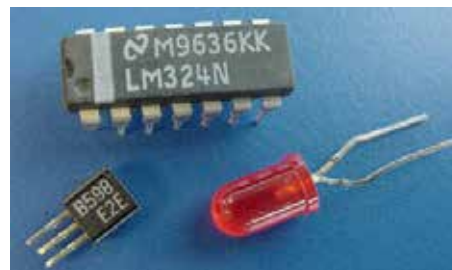


Fig 4.1.4: Semiconductor

Movement of electrons through a conductor

A positive charge (lack of electrons) is located on one end of the conductor and a negative charge (excess of electrons) is placed on the opposite end of the conductor, the following events occur if a source of power, such as a battery, is connected to the ends of a conductor. An imbalance of surplus electrons at one side of the circuit and a lack of electrons at the opposite side of the circuit is required for the flow of current.

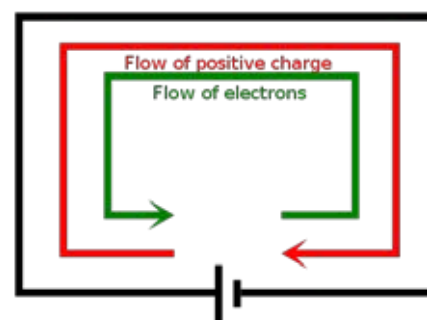


Fig 4.1.5: Movement of electrons in conductor

- The negative charge will repel the free electrons from the atoms of the conductor, whereas the positive charge on the opposite end of the conductor will attract electrons.
- As a result of this attraction of opposite charges and repulsion of like charges, electrons will flow through the conductor.

Sources of Electricity

1. **Friction:** When different materials are rubbed together, the friction generates and causes electrons to be transformed from one to the other. Now both materials are in electrically charged state. These charges are not in motion, they deposited on the surface.
2. **Heat:** Thermoelectricity is defined as when pieces of two dissimilar metals are connected together at both ends and one junction is heated then the current

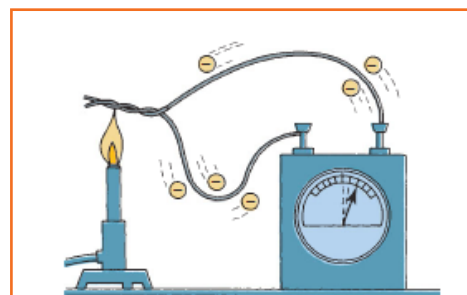


Fig 4.1.6: Generation of electricity by heat

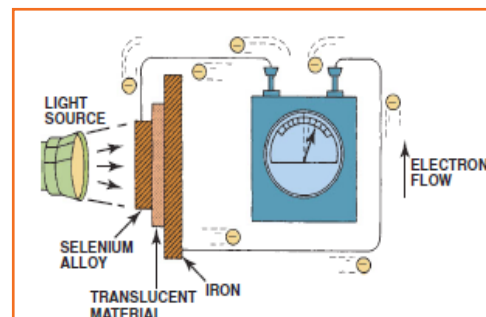


Fig 4.1.7: Generation of electricity by light

permits through the metals.

3. **Light:** The light energy is shifted to the free electrons of the metal when certain metals are exposed to light. This extra energy breaks the electrons free from the surface of the metal. Electrons can then be together and prepared to move in a conductor. Light-measuring devices such as automatic headlamp dimmers and photographic exposure meters used by this photo-electricity.
4. **Chemical:** A change is produced in potential or voltage when two dissimilar materials (usually metals) placed in a conducting and reactive chemical solution. It is the basis of the automotive battery and this principle is called electrochemistry.
5. **Magnetism:** If a conductor is moved through a moving magnetic field or a magnetic field near a conductor, electricity is created. This is the principle of how many automotive devices work, including:
 - Starter motor
 - Alternator
 - Ignition coils
 - Solenoids and relays

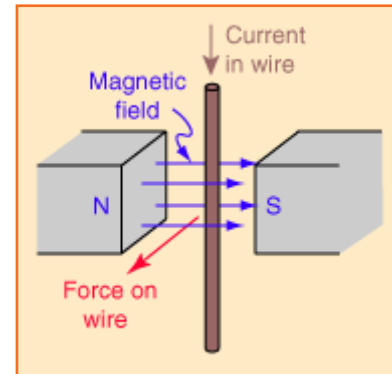


Fig 4.1.8: magnetism

Ask



- You could ask the examples of conductors, insulators and semiconductors.
- You could ask direction of flow of electron the circuit.
- You could ask different sources of electricity.

UNIT 4.2: Electric circuits and ohm's law

Unit Objectives

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

1. Understanding of electrical circuits and parts of a circuit
2. Understanding of Ohm's law
3. Understanding of different types of electrical circuit

Resources to be Used

- Available objects such as a duster, pen, notebook, drawing tools etc.

Do

- Welcome and greet the participants. Revise the learning's of the previous sessions and ask them if they have any doubts.

Say

- A circuit is a complete path in which electrons travel from a power source (like battery) through a load like light bulb and then return back to the power source.
- It includes basic knowledge of engineering drawing and engineering drawing standards.

Elaborate

A complete circuit contains following components:

- A battery is used as a power source
- Electrical circuit protection devices like fuses, circuit breakers, and fusible links are used for the protection from harmful overloads (excessive current flow).
- The flow of current from the power source to the resistance is defined as the power path.

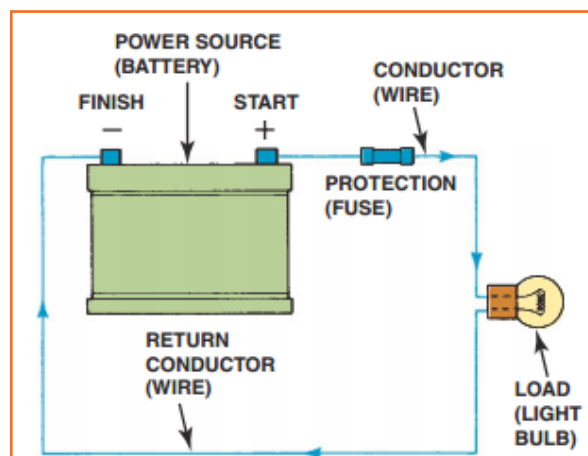


Fig 4.2.1: Electric circuit

- The electrical load or resistance which changes electrical energy into heat, motion, or light.
- The electrical current from the load back to the power source.
- Switches are used to turn the circuit on and off.

Circuit faults

Open circuits:

It is a circuit that isn't complete, or lacks continuity, due to a damaged wire.

Following features are of open circuits:

- Through an open circuit no current will flow.
- If there is a break formed in the circuit, and then an open circuit may be created and stops the flow of current.
- The function of a fuse is to blow (open) when the current in the circuit surpasses the fuse rating. To stop any damage to the components or wiring as a outcome of the fault, the fuse will stop flow of current.

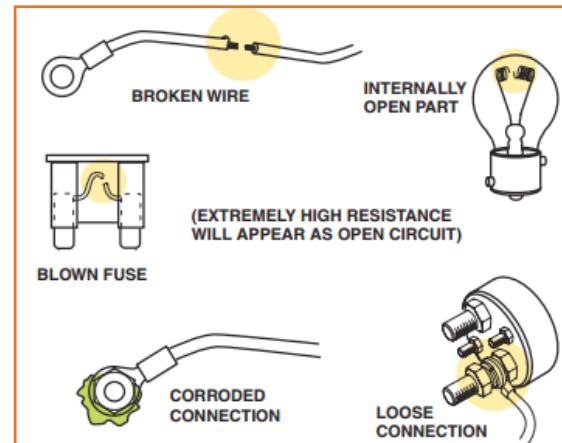


Fig 4.2.2: Open circuit

Short-to-voltage:

When the power side of one circuit is electrically joined to the power side of another circuit then a short-to-voltage occurs.

Following are the features of short circuit:

- A complete circuit in which the current generally bypasses some or all of the resistance in the circuit.
- The power side of the circuit is involved.
- A copper-to-copper connection (two power-side wires touching together) is involved.
- A fuse may or may not blow.

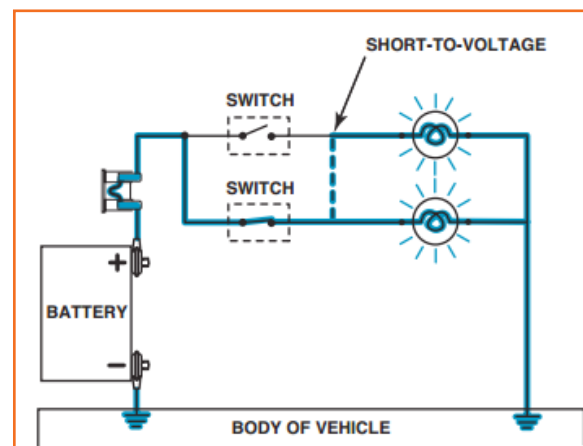


Fig 4.2.3: Short circuit

Ohm's law

Ohm's law tells us that a current flowing in a closed circuit has a direct relationship with the voltage given to that circuit and is inversely proportional to the resistance of that circuit, provided the temperature and physical condition is constant.

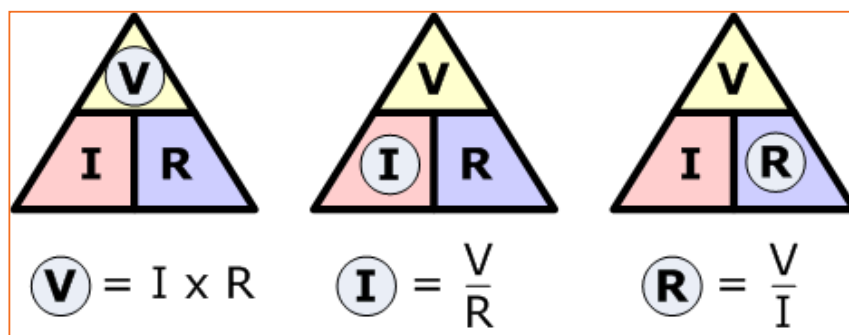


Fig 4.2.4: Ohm's law

If, for example, the current (I) is unknown but the voltage (E) and resistance (R) are known, then

Where,

I = Current in amperes (A)

E = Electromotive force (EMF) in volts (V)

R = Resistance in ohms (Ω)

VOLTAGE	RESISTANCE	AMPERAGE
Up	Down	Up
Up	Same	Up
Up	Up	Same
Same	Down	Up
Same	Same	Same
Same	Up	Down
Down	Up	Down
Down	Same	Down

Types of electric circuit

Series Circuit: A series circuit is a circuit that has multiple loads and a single path to go through. Such as a circuit that is connected with a battery and three light bulbs.

$$I = \frac{V}{R_1 + R_2 + R_3}$$

Parallel Circuit: Like the series circuit, the parallel circuit passes through more than one load. However, the circuit gives the current more than one path to complete the circuit with. Since it has

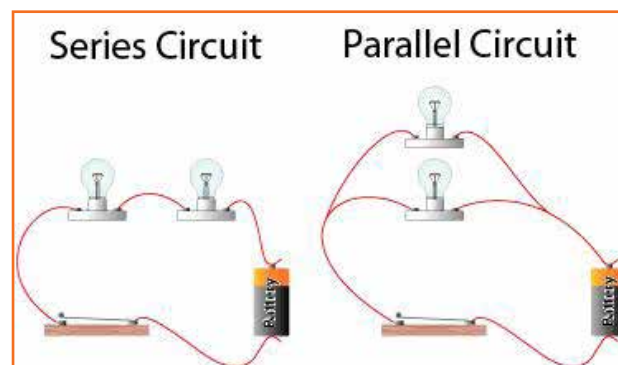


Fig 4.2.5: Series circuit and parallel circuit

multiple paths, the current will encounter less resistance by moving through all of the paths at the same time.

$$I = \frac{V}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

Series Parallel Circuit: The type of circuit is a combination of both series and parallel. Electric current travels through both circuits.

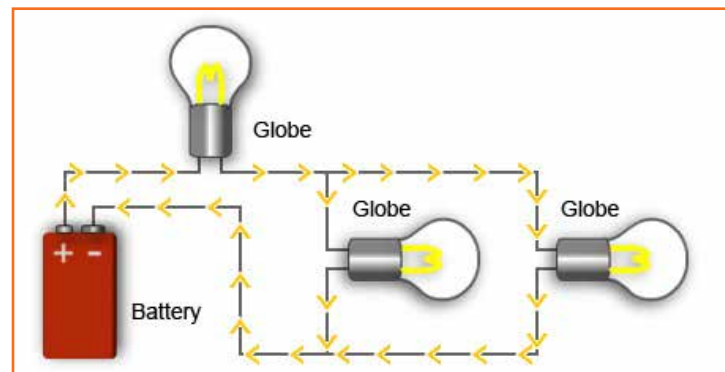


Fig 4.2.6: Series and parallel circuit

Demonstrate



As shown in the figure below for example, if a battery contains 12 volts is joined to a resistor of 4 ohms, how many amperes will travel through the circuit?

To analyse the number of amperes that will travel through the wires and the resistor by the use of Ohm's law. Remember, the factor (amperes) can be analysed by using Ohm's law if two factors are known.

$$I = \frac{E}{R} = \frac{12V}{4\Omega} A$$

Here (I) is 3 amperes if voltage (E) is 12 Volts and the resistance (R) 4 ohms.

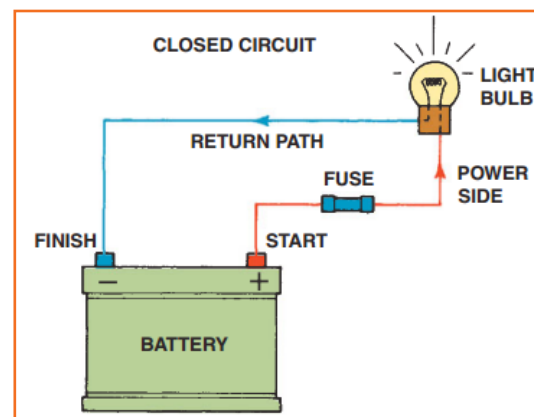


Fig 4.2.7: Ohm's law circuit

Notes for Facilitation



- You could ask the students about different types of electrical circuits and their formulas.
- You could ask the students about the representation of series circuit and parallel circuit.
- You could ask the different components of electric circuit and their properties.

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Make series and parallel circuit and calculate the value of resistance of the circuit	2 hours	Battery Ammeter Voltmeter Light bulb Wires and connectors

Do



- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

[illegible]



5. Preparing for assembly operation

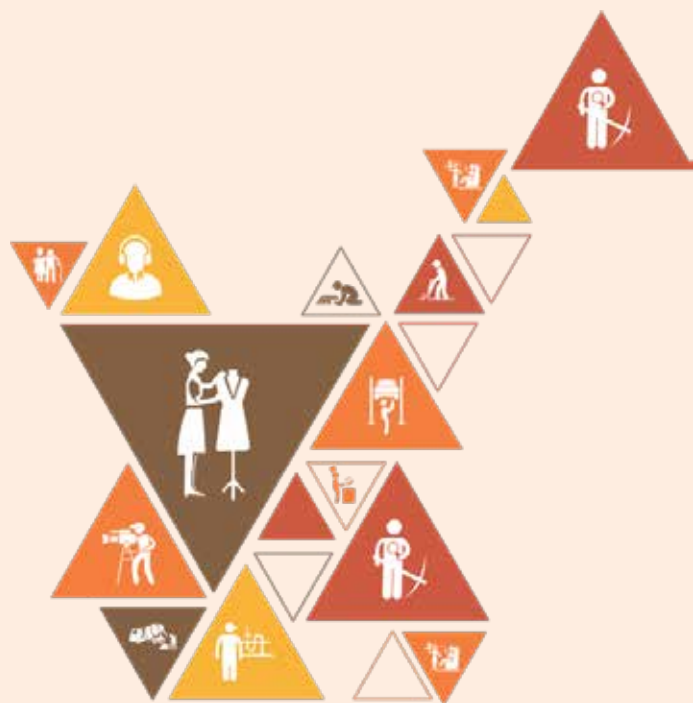
Unit 5.1 – Electronic components

Unit 5.2 – Electronic accessories

Unit 5.3 – Tools and measuring instruments required

Unit 5.4 – Understanding the engineering drawings

Unit 5.5 – Electronic symbols



Key Learning Outcomes

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

1. Know about Electronic components
2. Know about functions and applications of electronic components
3. Know about reading color coding of electronic components
4. Know about Electronic accessories
5. Know about fasteners required for electronic assembly
6. Know about tools and measuring instruments required
7. Know about use of Calibration of instruments
8. Know about Understanding the engineering drawings
9. Know about electronic components symbols.

UNIT 5.1: Electronic components

Unit Objectives

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

1. Know about various electronic components i.e. resistor, capacitor, diode etc.
2. Know about functions and applications of electronics components
3. Know about reading values of electronic components
4. Know about PCB's and PCB construction.

Resources to be Used

- Inivigator can use the available objects such as a Wire, light Bulb, battery, electric switch, capacitor etc.
- PC with LCD Projector or Flip Chart

Do

- Welcome and greet the participants. Revise the learning of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- Tell them about different electronic components used in the industry.
- Show them the electronic components.
- Explain them each component one by one.

5.1.1: Electronic components

Say



Electronic components are essential electronic element or electronic parts typically bundled in a discrete shape with at least two associating leads or metallic pads.

Some of the main Electronic Components are:

- resistors
- capacitors
- inductors
- diodes
- LED
- transistors
- Integrated circuit (IC)

Ask



- You could ask about different types of electronic components.
- Ask what they understand about the importance of electronic components.

5.1.2: Resistors

Say




The first and most common electronic component is the resistor. There is virtually no working circuit.

- **Resistance** - The estimation of resistance, estimated in Ohms. This is the essential parameter, and decides the present stream for any connected voltage.
- **Power** - The measure of power the resistor can deal carefully. Expansive resistors (physically) for the most part have a higher power rating than little ones, and this is constantly determined by the manufacturer.
- **Voltage** - Rarely indicated, however this is the most extreme voltage that may show up over a resistor.

Do



- Show the resistor symbol on white board i.e. 
- Show the resistance value is specified in ohms, the standard symbol is "R" or Ω .
- The tolerance of resistors is mostly 1%, 2%, 5% and 10%.

Elaborate



Types of resistor

There are a wide range of sorts of resistors utilized as a part of electronics. Each kind is produced using diverse materials.

- **Wire Wound resistor** - A wire wound resistor is an electrical passive segment that restricts current.
- **Carbon composition resistor** - Carbon composition comprise of a strong cylindrical shaped resistive component with installed wire leads or metal end caps to which the lead wires are appended. The body of the resistor is ensured with paint or plastic.
- **Carbon film resistor** - Carbon film resistors are a settled shape sort resistor.
- **Metal oxide resistor** - Metal-oxide film resistors are settled frame, axial resistors. They are made of ceramic rod that is covered with a thin film of metal oxides, example - tin oxide.
- **Variable Resistor** - On the off chance that lone two terminals are utilized, one end and the wiper, it goes about as a variable resistor or rheostat.

Function of resistor

- The primary capacity of resistors in a circuit is to control the stream of current to different segments. Take a LED (light) for instance. In the event that an excessive amount of current courses through a LED it is annihilated. So a resistor is utilized to limit the current.
- At the point when a current moves through a resistor energy is squandered and the resistor warms up.
- The rule by which resistors work can likewise be connected to warming components in irons, toasters, heaters, electric stoves and hair dryers, is that it disperses voltage as heat. Variable resistors may work as sensors, switches or voltage dividers.

Demonstrate



Reading the resistor value

The estimation of the resistor is set apart on the body utilizing hues. Each color is diverse number and you can recollect these numbers or you can simply utilize the table.

Colors

Here is the table with the colors and numbers. As you can see they are:

- o BLACK: 0
- o BROWN: 1
- o RED: 2
- o ORANGE: 3
- o YELLOW: 4
- o GREEN: 5
- o BLUE: 6
- o VIOLET: 7
- o GREY: 8
- o WHITE: 9

But this is not for all colors. From right to left the second color is multiplier. Digits from the first colors must be multiplied with the number of this color.

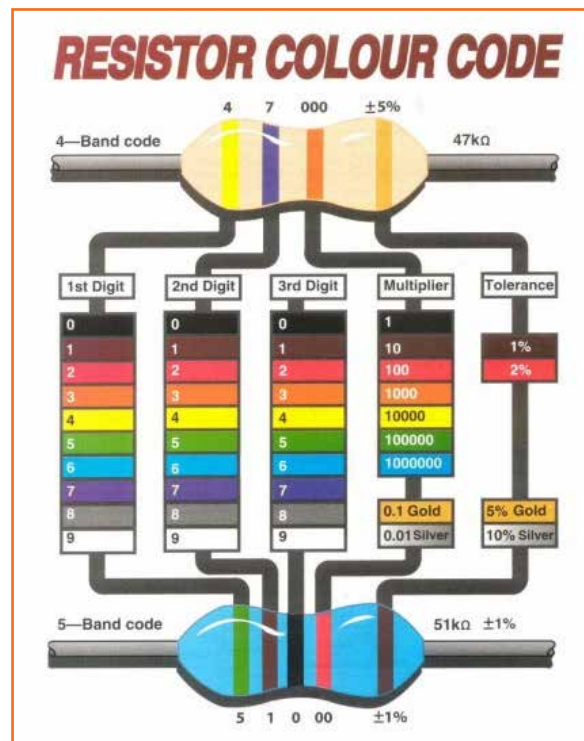


Fig 5.1.1: Resistor colour coding

- o BLACK: 1
- o BROWN: 10
- o RED: 100
- o ORANGE: 1000
- o YELLOW: 10000
- o GREEN: 100000
- o BLUE: 1000000
- o GOLD: 0.1
- o SILVER: 0.01

And the last color: This is tolerance. Tolerance is the precision of the resistor and it is given as a percentage

Ask



- You could ask the different color which indicates to different number.
- What is the standard symbol of resistor
- What is the tolerance value of resistor

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Reading resistor value	1 hours	Resistor

Do



- Ask them to get practice in pairs.
- Give each pair a resistor for reading its value

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.1.3: Capacitor


Say



- Capacitors are parts that can store electrical pressure (Voltage) for drawn out stretches of time.
- The tolerance of the majority capacitors is commonly 10%, however by and by it is normally superior to that. Close tolerance kinds (e.g. 1%) are accessible; however they are generally quite costly.

Do



- Show the symbol of capacitor on white board i.e. 
- Write the standard symbol of capacitor – “C” or “F”, depending upon the context. The unit of measurement for capacitance is Farad but this unit is much too large for practical work. It is usually measured in microfarads (uF) or picofarads (pF)
- Also discuss the tolerance value of capacitor.

Elaborate



Types of capacitor

- **Ceramic Capacitor** - A ceramic capacitor is a non-polarized set capacitor made out of at least two substituting layers of ceramic and metal in which the ceramic material goes about as the dielectric and the metal goes about as the electrodes.
- **Film capacitors** - Film capacitors are non-polarized capacitors having a dielectric of insulating plastic film.
- **Electrolyte Capacitor** - Electrolytic capacitors have a metallic anode secured with an oxidized layer utilized as dielectric.
- **Variable Capacitor** - Variable capacitors might get their capacitance modified by mechanical motion. For the most part two renditions of variable capacitors must be recognized: Tuning capacitor and Trimmer capacitor.

Functions of capacitor

Functions of capacitor in electronic circuits are as follows:

- Storing electrical energy.
- Avoid stepping over the electric circuit which are using coil like power supply, adapter, lamps etc.
- Selecting a radio wave transmitter which was captured by the aircraft radio recipient.

Demonstrate



Reading the capacitor value

- **Know the units of measurement.** The base unit of capacitance is the farad (F). This value is much too huge for ordinary circuits, so domestic capacitors are named with one of the accompanying units:
 - o 1 μ F, uF, or mF = 1 microfarad = 10^{-6} farads. (Careful — in other contexts, mF is the official abbreviation for millifarads, or 10^{-3} farads.)
 - o 1 nF = 1 nanofarad = 10^{-9} farads.
 - o 1 pF, mmF, or uuF = 1 picofarad = 10^{-12} farads.
- **Read the capacitance value.** Most vast capacitors have a capacitance value printed on the side.
- **Look for a tolerance value.** A few capacitors list a tolerance, or the most extreme expected range in capacitance contrasted with its recorded value.
- **Check the voltage rating.** If there is room on the body of the capacitor, the manufacturer usually lists voltage as a number followed by a V, VDC, VDCW, or WV (for “Working Voltage”). This is the maximum voltage the capacitor is designed to handle.
- **Look for a + or - sign.** If you see one of these next to a terminal, the capacitor is polarized.
- **Read the tolerance code on ceramic capacitors.** Ceramic capacitors, which are normally little ‘pancakes’ with two pins, commonly list the resistance value as one letter quickly after the three-digit capacitance value.
- **Read letter-number-letter tolerance values.** Many kinds of capacitors speak to the tolerance with a more point by point three-image framework.
- **Interpret voltage codes.** You can look up the EIA voltage chart for a full list, but most capacitors use one of the following common codes for maximum voltage.

Ask



- What do you understand by capacitor?
- What are the different types of Capacitor
- Where the capacitors are used?
- What is the symbol of capacitor?

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Reading capacitor value	1 hours	Capacitor

Do



- Ask them to get practice in pairs.
- Give each pair a capacitor for reading its value
- Go around and make sure they are doing it properly.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.1.4 Inductor


Say



- An inductor is most generally a coil, yet in actuality, still a straight bit of wire has inductance.
- An inductor can be viewed as the inverse of a capacitor. It passes DC with little resistance, however turns out to be a greater amount of an impediment to the signal as frequency increments.

Do



- Inductance is measured in Henrys (H) and has the image 'L'. The average range is from a couple of smaller scale Henrys up to at least 10H.
- Show the Symbol of inductor on board 

Elaborate



Functions and applications of inductors are:

- An inductor associated with a capacitor frames a tuned circuit, which goes about as a resonator for oscillating current. Tuned circuits are generally utilized as a part of radio frequency hardware, for example, radio transmitters and receivers, as thin bandpass filters to choose a solitary frequency from a composite signal, and in electronic oscillators to produce sinusoidal signs.
- Two (or more) inductors in vicinity that have coupled attractive flux (common inductance) shape a transformer, which is a principal part of each electric utility power network.
- Inductors are additionally utilized in electrical transmission frameworks, where they are utilized to restrict exchanging currents and fault currents. In this field, they are all the more generally alluded to as reactors.

Ask



- You could ask the measuring unit of Inductor.
- What is the symbol of Inductor

5.1.5 Diode

Say



- A diode is a particular electronic segment with two electrodes called anode and cathode. Most diodes are prepared with semiconductor materials, for example, silicon, germanium, or selenium.
- The p-side or positive end is referred as anode and the n-side or negative end is referred as cathode.

Elaborate



Function of diode

The key capacity of a perfect diode is to control the bearing of current-flow. Current going through a diode can just go one way, called the forward direction. Current attempting to flow in the turnaround direction is blocked. They're similar to the one-way valve of electronics.



Fig 5.1.2: Diode and its symbol

In the event that the voltage over a diode is negative, no current can flow, and the best diode resembles an open circuit. In such a circumstance, the diode is said to be off or reverse partial.

For whatever length of time that the voltage over the diode isn't negative, it'll "turn on" and conduct current. In a perfect world a diode would act like a short circuit (0V crosswise over it) in the event that it was conducting current.

Diode Applications: Diodes are utilized as a part of building AC to DC Power Supply, rectifier, Diode Gates, Diode Clamp, Limiter.

Ask



- You could ask about the diode.
- What are the functions of diode.

5.1.6 Light emitting diode (LED)

Say



A light-emitting diode (or LED) is an extraordinary kind of diode that discharges light when current goes through it. A light-producing diode (LED) is a two-lead semiconductor light source.

Do



- Show the symbol of LED on white board



Tips



- A slight overabundance in voltage or current can harm the gadget.
- The gadget is known to have a substantially more extensive data transmission contrasted with the laser.
- The temperature relies upon the radiant yield power and wavelength.

Elaborate



Function of LED

LED uses fall into four major categories:

- Visual signals where light goes pretty much straightforwardly from the source to the human eye, to pass on a message or importance.
- Illumination where light is reflected from items to give visual reaction of these articles.
- Measuring and collaborating with forms including no human vision.
- Narrow band light sensors where LEDs work in a reverse-bias mode and react to occurrence light, rather than producing light.

Ask



- You could ask the student what they understand by LED.
- Discuss the advantages of LED.
- You could ask the symbol of LED.

5.1.7 Transistors

Say



- A transistor is a three-terminal gadget in which a voltage connected to one of the terminals (called the base) can control current that streams over the other two terminals (called the collector and the emitter). The transistor is a standout amongst the most vital gadgets in electronics.

Elaborate



Transistors are generally three-terminal gadgets. On a bi-polar junction transistor (BJT), those pins are marked **collector (C)**, **base (B)**, and **emitter (E)**. The circuit images for both the NPN and PNP BJT are beneath:

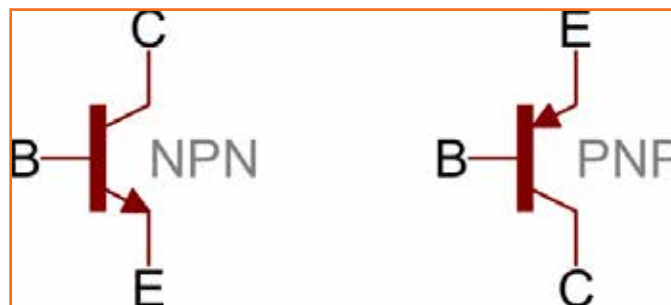


Fig 5.1.3: Type of transistor

The main contrast between a NPN and PNP is the direction of the arrow on the emitter. The arrow on a NPN pointing outward direction and on the PNP it is pointing in

The four transistor operation modes are:

- Saturation** – The transistor demonstrates like a short circuit. Current openly spills out of collector to emitter.
- Cut-off** – The transistor demonstrates like an open circuit. No current run from collector to emitter.
- Active** – The current from collector to emitter is corresponding to the current running into the base.
- Reverse-Active** – Like active mode, the current is relative to the base current, yet it streams backward. Current flows from emitter to collector (not, precisely, the reason transistors were intended for).

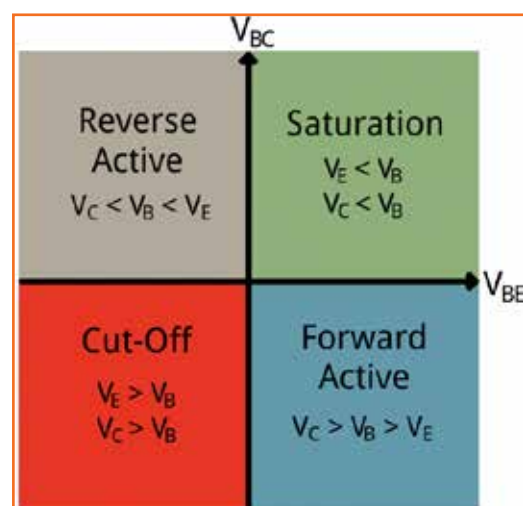


Fig 5.1.4: Diode operation modes

Function and applications of transistor

The transistor as an amplifier

1. A transistor can be utilized to amplify current. This is on the grounds that a little change in base current causes an expansive change in collector current. Instance is a microphone.
2. Sound waves that are encouraged into the microphone make the diaphragm in the microphone to vibrate.
3. The electrical yield of the microphone changes as per the sound waves.
4. As an outcome, the base current is differing as a result of the little rotating voltage delivered by the microphone
5. A little change in the base current causes an extensive change in the collector current.
6. The changing authority current streams into the loudspeaker. There, it is changed into the sound waves relating to the original sound waves.
7. The frequencies of both waves are proportionate however the amplitude of the sound wave from the loudspeaker is higher than the sound waves bolstered into the microphone.

The transistor as switch

1. In a transistor, no current can stream in the collector circuit unless a current streams in the base circuit. This property enables a transistor to be utilized as switch.
2. The transistor can be switched on or off by altering the base.
3. There are a couple of sorts of exchanging circuits worked by transistors.
 - (a) Light-Operated Switch
 - (b) Heat-operated switch

Ask

- What are non-linear device.
- Name the operation mode of transistor.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.1.8 Integrated Circuit (IC)

Say



- An integrated circuit or monolithic integrated circuit is an arrangement of electronic circuits on one little plate of semiconductor material, regularly silicon.
- An integrated circuit (IC), some of the time called a chip or microchip, is a semiconductor wafer on which thousands or a great many modest resistors, capacitors, and transistors are manufactured.
- An IC can work as an intensifier, oscillator, clock, counter, PC memory, or microprocessor.

Elaborate



The capacity of an incorporated circuit (IC) is to be a solitary segment that can perform abnormal state errands, for example, amplification, signal processing, or even advanced computerized calculations as on account of microprocessors. Barely any electronic circuits don't utilize an IC or a chip or microchip. Besides, the capacity of a coordinated circuit incorporates miniaturization, cost lessening, and execution improvement among others.

Ask



- What is another name of Integrated Circuit?
- What includes the function of Integrated circuit?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.1.9 PCB (Printed Circuit Board)

Say



- PCB is an electronic board that connects circuit components. It is rugged, inexpensive and can be highly reliable.

Elaborate



Materials of PCB

- Conducting layers are usually made of thin copper foil.
- The board is coated with a solder mask which is in green color. Other colors like blue and red are also available.
- Remove unwanted copper from the substrate after etching and only leave the required traces or pathways of copper.

Parts of PCB

- Components
- Pads
- Traces
- Vias
- Top Metal Layer
- Bottom Metal Layer

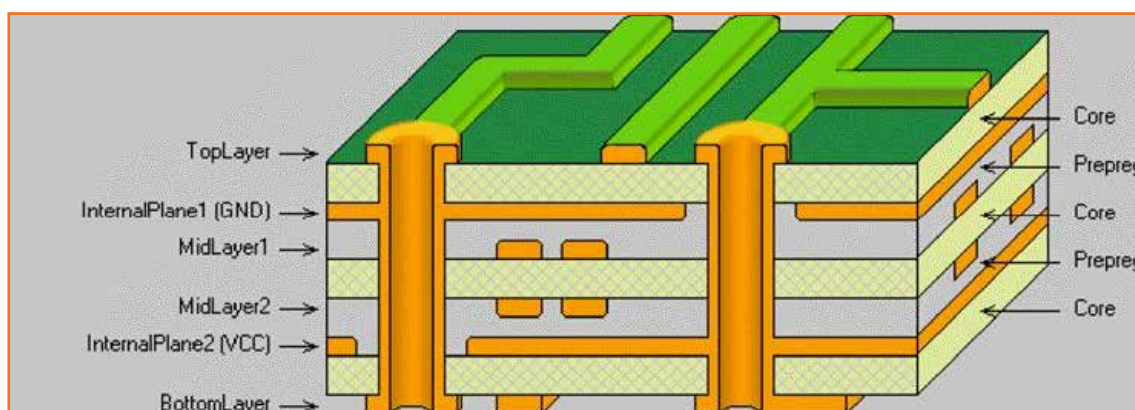


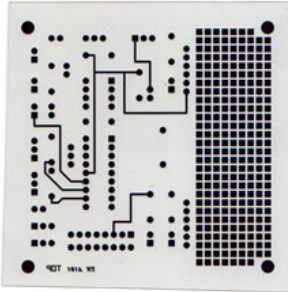
Fig 5.1.5: PCB board layout

Demonstrate



Steps in PCB design

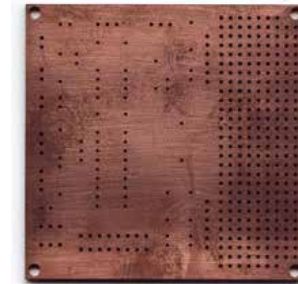
1. Film Generation



2. Shear Raw Material

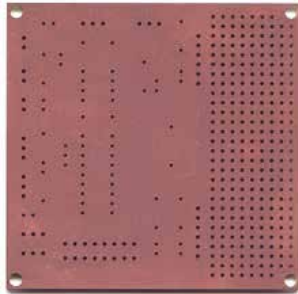


3. Drill Holes



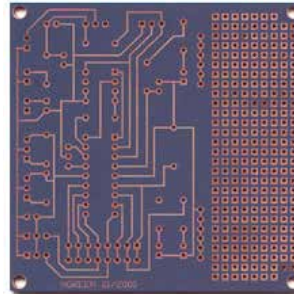
Industry standard 0.059" thick,
copper clad, two sides

4. Electroless Copper



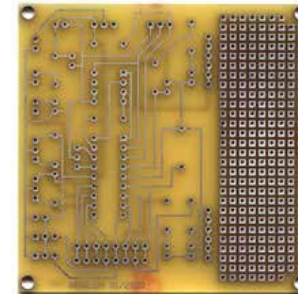
Apply copper in hole barrels

5. Apply Image



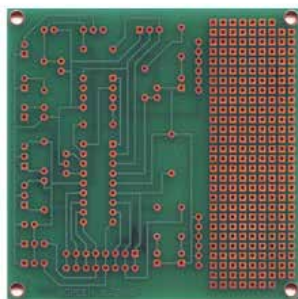
Apply Photosensitive Material to
develop selected areas from panel

6. Strip and Etch

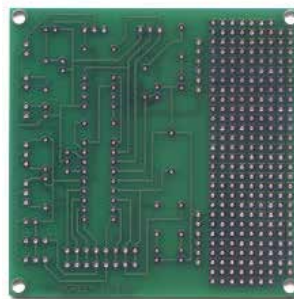


Remove dryfilm, etch
exposed copper

7. Solder Mask

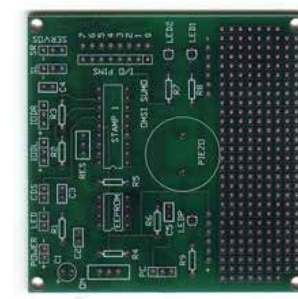


8. Solder Coats



9. Silkscreen

Apply white letter marking
using screen printing process



Ask



- What are the materials of PCB.
- What are the parts of PCB.
- You could ask the steps of PCB design.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

UNIT 5.2: Electronic accessories

Unit Objectives

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

1. Know about different types of cables
2. Know about different types of cable connectors
3. Know about fasteners required for electronic component assembly.

Resources to be Used

- Invigilator can use the available objects such as a Wire, light Bulb, battery, electric switch, capacitor etc.

Do

- Welcome and greet the participants. Revise the learning of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students who get out during the game to be the music keepers. They can start and stop the music as the game progresses.
- Encourage shy students to provide information about themselves by prompting them with questions such as 'what do you enjoy doing the most', 'what is your favorite movie or book' etc.
- Brief about electronic accessories.
- Explain the government initiatives in this sector.
- You could ask from the students about employment opportunities in the industry.

5.2.1 Cables

Say



- An electrical cable is made of at least two wires running next to each other and reinforced, wound, or meshed together to shape a solitary get together, the finishes of which can be associated with two devices, which empower the exchange of electrical signals from one device to other.
- **Cable Color Code** – Color coding of cable insulation is done to decide active, neutral and earth conductors. Diverse nations/areas have distinctive cable color coding, and it is basic to realize what is relevant in your district. Be that as it may, active conductors can't be green/yellow, green, yellow, light blue or black.
- **Cable Size** – Cable size is the gauge of individual wires inside the cable, for example, 14, 12, 10 and so forth – once more, the greater the number, the little the size. The number of wires tags on the wire-gauge on a cable.
- **Types of electrical cables**- Non metallic sheathed, underground feeder, Metallic sheathed cable, Multi-conductor, coaxial cable, unshielded twisted pair cable, ribbon cable, direct buried, Twin-lead, paired and twisted pair.

Elaborate



Types of Electrical Cables

- **Non-Metallic Sheathed Cable:** These cables are also known as non-metallic building wire or NM cables.
- **Underground Feeder Cable:** These cables are quite similar to NM cables, but instead of each wire being individually wrapped in thermoplastic, wires are grouped together and embedded in the flexible material
- **Metallic Sheathed Cable:** Also known as armored or BX cables, metal-sheathed cables are often used to supply mains electricity or for large appliances.
- **Multi-Conductor Cable:** This is a cable type that is commonly used in homes, since it is simple to use and well-insulated.
- **Coaxial Cable:** A coaxial cable features a tubular insulating layer that protects an inner conductor which is further surrounded by a tubular conducting shield, and might also feature an outer sheath for extra insulation.
- **Unshielded Twisted Pair Cable:** Like the name suggests, this type consists of two wires that are twisted together. The individual wires are not insulated, which makes this cable perfect for signal

transmission and video applications.

- **Ribbon Cable:** Ribbon cables are often used in computers and peripherals, with various conducting wires that run parallel to each other on a flat plane, leading to a visual resemblance to flat ribbons. These cables are quite flexible and can only handle low voltage applications.
- **Direct-Buried Cable:** Also known as DBCs, these cables are specially-designed coaxial or bundled fiber-optic cables, which do not require any added sheathing, insulation or piping before being buried underground.
- **Twin-Lead Cable:** These are flat two-wire cables that are used for transmission between an antenna and receiver, like TV and radio.
- **Paired Cable:** With two individually insulated conductors, this cable is normally used in DC or low-frequency AC applications.
- **Twisted Pair:** This cable is similar to paired cables, but the inner insulated wires are twisted or intertwined.

Ask



- What do you understand by Cables?
- What is Non-Metallic sheathed cable?
- What are the two wire cables for transmission?
- You could explain the cable size?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.2.2: Fiber optic cables

Say



- An optical fiber cable is a cable containing at least one optical fiber that are utilized to convey light.
- A fiber optic cable comprises of a heap of glass strings, each of which is equipped for transmitting messages regulated onto light waves.
- Types of fiber optic cables- Single mode and Multi mode.

Elaborate



Advantages

- Fiber optic cables have a significantly more prominent data transfer capacity than metal links. This implies they can convey more information.
- Fiber optic cables are less vulnerable than metal cables to obstruction.
- Fiber optic cables are significantly more slender and lighter than metal wires.
- Data can be transmitted digitally as opposed to analogically.

Types of fiber-optic cables

- **Single modes**- The least difficult kind of optical fiber is called single-mode. It has a thin core around 5-10 microns (millionths of a meter) in diameter.
- **Multi modes**- Another kind of fiber-optic cable is called multi-mode. Each optical fiber in a multi-mode cable is around 10 times greater than one in a single-mode cable.

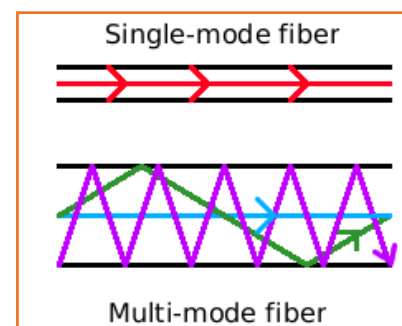


Fig 5.2.1: Fiber optical modes

There are two principle sorts of material utilized for optical fibers: glass and plastic. They offer broadly extraordinary attributes and discover utilization as a part of altogether different applications. For the most part, plastic fiber is utilized for short range and customer applications; glass fiber is utilized for short/medium range (multi-mode) and long range (single-mode) media communications.

Color code, utilized as a part of fiber optics, looks like that of copper. The significant distinction is 12-Color succession as restrict to 10-Color for copper. The series of color is the same, with expansion of two Color - Rose (11-th) and Aqua (12-th)

Fiber color codes in free tube cables, this color code will be utilized for tubes and in addition to fibers inside the tubes and subgroups.

Fiber optic cable jacket and connector color

- For **outdoor aerial and burial type cables**, the jacket color is usually black polyethylene for both multimode and single-mode cables to prevent UV radiation damage.
- For **indoor cables**, the outer most fiber cable jacket may be any color but the de facto industry standard is:
 - o Orange for multimode fibers
 - o Yellow for single-mode fibers

Ask

- What are the advantages of Fiber optic cables?
- You could ask the types of Fiber optic cables?
- Name the types of material used for optical fibers.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.2.3: Connectors

Say



- An electrical connector is an electro-mechanical gadget used to join electrical terminations and make an electrical circuit.
- Electrical connectors are described by their pinout and physical development, size, contact resistance, insulation between pins, roughness and imperviousness to vibration, imperviousness to entry of water or different contaminants, imperviousness to pressure, reliability, lifetime, and simplicity of connecting and disconnecting.

Elaborate



Commonly used connectors:

1. **USB Connectors:** Host and peripheral are the two types of USB connectors. In USB, there is a contrast between the cable connectors and devices.
 - o **Molded strain relief** - All USB cables have plastic over-trim at the connector to counteract strain on the cable that could conceivably harm the electrical connections.
 - o **USB-A connector** is the standard “peripheral” connector type.
 - o **USB-B Connector** is a standard for peripheral devices.
2. **Audio Connectors-** Another familiar connector group is those used for audio-visual applications.
 - o **Phone type connectors:** You’ll probably immediately recognize the 1/8” version of this connector as a plug on the end of a pair of headphones. These connectors actually come in three common sizes: 1/4” (6.35mm), 1/8” (3.5mm), and 2.5mm. 1/4” size connectors.
3. **RCA Connectors:** RCA connectors are usually found on devices, although it is possible to find extension or conversion cables with female jacks.
 - o **Power Connectors-** Some connectors are used specifically to provide power connections to devices.
4. **Barrel Connectors:** Barrel connectors are typically found on low-cost consumer electronics which can be plugged into wall power via bulky AC wall adaptors.

Barrel connectors provide only two connections, frequently referred to as “pin” or “tip” and “sleeve”.



Fig 5.2.2: Barrel Connector

5. **“Molex” Connectors:** Most computer hard drives, optical drives, and other internal peripherals get power through what is typically called a “Molex” connector.
6. **IEC connector** - usually refers to the power supply inlet which is commonly seen on desktop PC power supplies.
7. **Pin Header Connectors:** Pin header connectors comprise several different means of connection.



Fig 5.2.3: Molex Connector



Fig 5.2.4: IEC Connector

Temporary connectors

- o **Screw Terminals:** In some cases, it may be desirable to be able to connect bare, un-terminated wire to a circuit.
- o **Banana Connector:** Most pieces of power test equipment (multimeters, power supplies) have a very simple connector called a “banana jack.”
- o **Alligator Clip:** Alligator clips are good for test connections to posts or bare wires.
- o **Ring and spade terminals:** Electrical contact is made by the flat surface of the ring or spade, while mechanically they are attached by passing a screw or bolt through them.

Ask



- What is Banana jack.
- What are the two connections of barrel connectors?
- What is Audio connector and there version of connectors.
- Discuss the temporary connectors.
- What are the commonly used connectors?
- What are the two flavor of USB connector?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

5.2.4 Fasteners

Say



- A fastener is an equipment gadget that mechanically joins or appends at least two objects together.

Elaborate



Mechanical fasteners for electrical products come in three classifications:

- One manages with threaded inserts for plastic. These hold plastic cases to metal boards or to other plastic parts.
- Other nibbles into metal sheets, for example, panels and chassis. Since the primary employment of these fasteners is to hold parts together, they depend essentially on mechanical properties.
- But a third sort of fastener depends likewise on its oxidization resistance and electrical properties, for example, fasteners and nuts that interface strong bus bars or tightens to wires in terminal strips.

Threaded inserts for plastics: Threaded inserts for plastics appears in three styles. Ultrasonic tools put in one type, other cast straight in the plastic, and the third press fits into an already present hole.

Ultrasonic inserts for plastics are further classified into three types.

- o One fits tapered holes for rapid and accurate alignment.
- o Another fits straight-walled holes, where a special lead-in helps alignment.
- o The third is a symmetrical insert which installs in either a straight or tapered hole and needs no special orientation.

Self-clinching fasteners are likewise broadly utilized for electronics items. They are normally strung and press into flexible metal or circuit boards.

Electrical fasteners normally utilize nonferrous parts to anticipate electrolytic decay and rust. Electrolytic corrosion grows involving copper channels and steel combinations in sticky climates, and rust brings down electrical conductivity and can pluck screws. Subsequently, top notch clamping parts are generally made of brass while screws are high-tensile copper alloys.



Fig 5.2.5: Different types of fasteners

Ask



- What is known as Fastener?
- What are the three styles for Threaded inserts for plastics.
- What are the types of Ultrasonic insert for plastics?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

UNIT 5.3: Tools and measuring instruments required

Unit Objectives

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

1. Discuss about different hand tools
2. Know about how to use tools properly

Resources to be Used

- Available objects such as a duster, pen, notebook, hand tools etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say




- Spanners are used to apply a twisting force (torque) to tighten or release a nut, bolt or threaded fasteners.
- Hammers are more suitable as the force of the blow is distributed over a larger area and any stretching of the metal is reduced or even eliminated.
- Files are one of the most important and most frequently used of the fitter's hand tools.
- The screwdriver is a driving tool with a blade fitted to a handle. The tip of the blade is shaped to fit in to the head of a screw and, when turned, will either tighten or loosen the screw.
- Ammeter and voltmeter are used to measure the current and voltage value in the circuit






Do




- Show all the tools to the students.
- Demonstrate the use of tools.
- Explain the use of tools.

Elaborate



TOOL	USAGE	IMAGE
Screwdrivers	<p>Screw driver is a tool used for driving in or removing a screw. To use a screwdriver:</p> <ul style="list-style-type: none"> Choose the correct size and tip of the screw driver, so that it fit into fastener's head easily. If required make a starter hole by drill or pressing the tip into object. Insert tip of screwdriver into the screw head and turn its handle clockwise direction, then apply pressure over the handle so that tip can inserted into the handle properly. Continue turning the screwdriver firmly and check that that screw is in straight position while inserting in the material. 	
Pliers <ul style="list-style-type: none"> Combination Slip joint Side cutters Long nose 	<p>Pliers are used for gripping, twisting and cutting wires. To use pliers:</p> <ul style="list-style-type: none"> Determine the type of pliers required. Make any adjustments if required for slip joint Adjust locking pliers before using. Press the handles of plier and close its jaws for holding the object. To turn the object, rotate the tool as required. Keep the fingers away from the jaws for safety. 	
Hammers <ul style="list-style-type: none"> Ball peen hammer Engineers hammer Soft faced Rubber mallet Dead blow Brass Leather 	<p>Hammers are used to drive nails, fit parts, forge metal, and break apart objects. To use a hammer:</p> <ul style="list-style-type: none"> Select the weight of the hammer appropriate to the fastener to be struck. Make tight grip at the hammer handle lower half, then swing the hammer slowly and hit the fastener head squarely. Do not strike your hand by the hammer head or handle. Wave the hammer with extra power to strike the fastener head. Continue the process of striking the fastener head to drive it into the material. 	

Testing Lamps	A testing lamp is used to diagnose and troubleshoot an electrical problem.	
Ampere Meter	It is used to measure electrical current in an appliance. To use it break the circuit and attach the instrument to allow the electrical current to flow through the meter for measuring.	
Volt Meter	Volt meter is used to measure AC or DC voltages of electrical components. Voltmeter is used to measure the voltage available in the circuit.	
Megger - Manual Megger - Electronic Megger	This device is used to measure electrical leakage in wire. It is used for checking the electrical insulation level of electrical machines and devices like motor, generator winding, etc.	
Wire wrapping tool	It is a process to build electronic circuit boards. Electronic components riding on an insulating board are connected by insulated wire run with the connections made around a component lead or socket pin.	

Crimping Tool	It is assembling 2 pieces of metal or other ductile material by distorting one or both of them to grip the other. The bend or irregularity is called the crimp.	
Static Safe Tweezers	These well-made tweezers are a cheap solution to your soldering requirement and perfect for picking or placing small electronic components on SMD and through hole in PCBs. The non-metallic/non-static material creates these tweezers appropriate for use with voltage sensitive devices and decreased the risk of scratching or damaging components.	
Wire Stripper	To strip the electrical insulation from electric wires a wire stripper hand-held device used.	

Ask



- You could ask about the details of tools used in an engineering workshop

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Demonstrate the proper use of tools

Skill Practice	Time	Resources
Use of tools	2 hours	All hand tools
		All measuring instruments

Do 

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

UNIT 5.4: Understanding the engineering drawing

Unit Objectives

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

1. Discuss about basics of engineering drawing
2. Know about orthographic projection views
3. Discuss about concept of quadrants
4. Know about engineering standards
5. Know about tools require for engineering drawing

Resources to be Used

- Available objects such as a duster, pen, notebook, drawing tools etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- The reason for engineering drawing is to pass on graphically the thoughts and fundamental data for the development or examination of structures, machines or frameworks.
- It includes basic knowledge of engineering drawing and engineering drawing standards.

Notes for Facilitation

- You could ask the students about the purpose of engineering drawing.

5.4.1: Basic knowledge of engineering drawing

Say

- Engineering drawing a graphical language utilized by specialists and other specialized faculty related with this profession.
- In basic engineering drawing, orthographic projection method is used.
- Orthographic drawings are the establishment of technical and machine drawings.

Elaborate

- The orthographic projection demonstrates the object like it views from the front, right, left, base, top or back, as per the projections in first-angle or third-angle projection. Third angle orthographic projection is standard projection for every single mechanical drawing.
- Orthographic projection is the technique for speaking to the correct state of an object in at least two perspectives, on projection planes commonly at right angle position to each other or by drawing perpendiculars from object to planes.
- For example: Orthographic views of a cylinder are

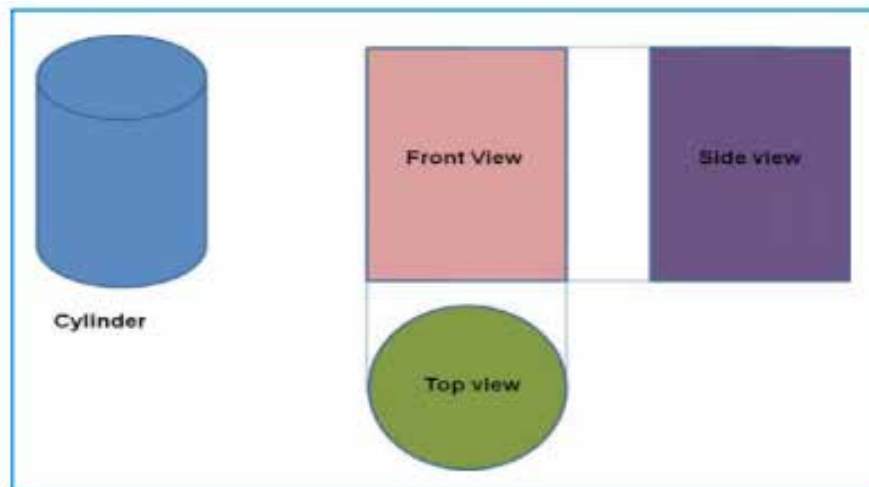


Fig 5.4.1: Orthographic projection of a cylinder

Do

- Tell them about the orthographic projection and quadrants
- Show them the orthographic views
- Demonstrate them the first and third angle of projection

Demonstrate



For basic engineering drawings; two guidelines are regularly being used in orthographic projection; the first angle projection also known as European projection and third angle projection also known as American projection. Perspectives are indistinguishable in both techniques for projection with the exception of their relative positions on the drawing paper. So, let's understand them:

1st angle Projection – In 1st angle projection, the front view is reference VIEW and other views are drawn as “shadows” of that view. For example, the left hand side view is drawn on the right side of front view. So, the top view (plan) is drawn at the base of front view, and so on.

Step 1: Rotate the Horizontal Plane Clockwise through 90° .

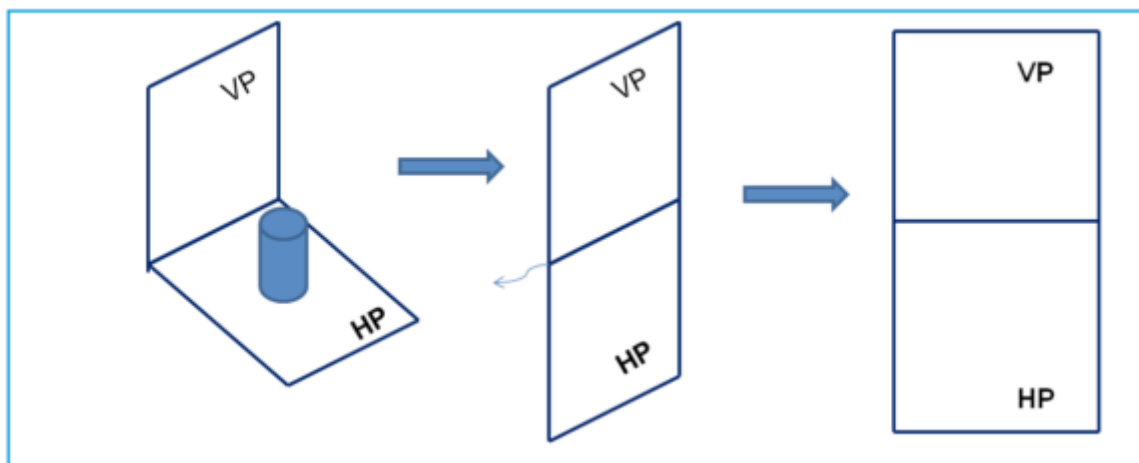


Fig 5.4.2: First angle projection

Step 2: Rotate the planes clockwise through 90° to face the observer.

3rd angle Projection – In 3rd angle projection, the front view is the premise (similarly as before) however other views are drawn as “reflections” of front view. In this projection, the left hand side view is drawn on the left hand side of front view. Additionally, the top view (plan) is drawn over the front view.

Step 1: Rotate HP through 90° in the clockwise direction

Step 2: Rotate the planes through 90° in the clockwise direction to face the observer

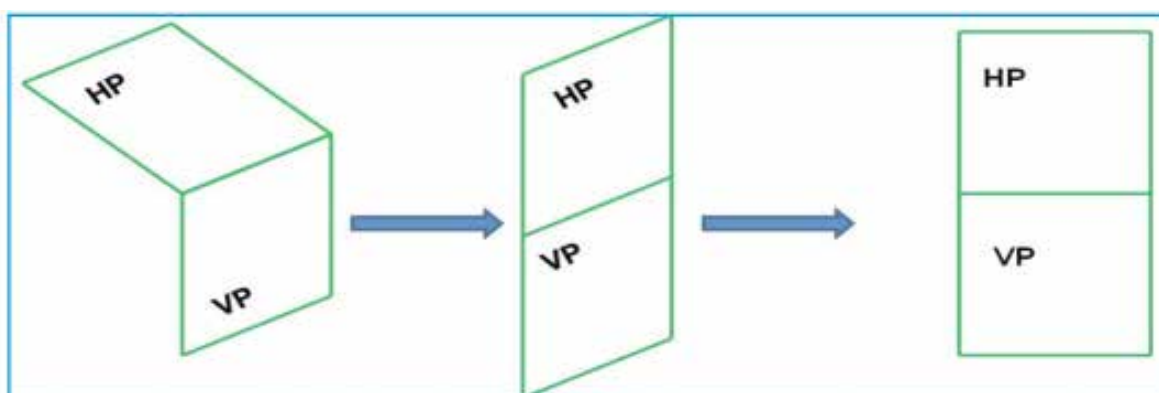


Fig 5.4.3: Third angle projection

Tips



For drawing technical drawings, some tips given are:

- **Visualize Object:** Visualize the definite and clear picture of object in mind, and then a decent graphical picture can be created.
- **Determine Views:** The perspectives might possibly be the same with respect to a scale drawing; e.g., the thickness or state of the line can be utilized to draw a view.
- **Determine Size:** Determine the size of sheet of paper for portraying the object. Size of the sheet should be enough to show all details the object, however permit a lot of space for measurements, notes, and particulars.
- **Locate Center Lines:** When going to start drawing, always locate the inside lines of object.
- **Block in Main Outlines:** Check the extents of width to height in drawing. Select one edge of the object as a unit and assess the proportionate lengths of alternate edges.
- **Complete Detail:** Once the primary blueprint is acceptable, fill the points of interest for right extent.
- **Dimension Lines and Arrowheads:** When the state of the object has been drawn completely, then include the measurement arrowheads and lines. Don't make any estimation until the work is finished.
- **Dimensions:** Now embed the measurements on the drawing. These measurements can be obtained by a steel cable. Take all estimations from completed surfaces.
- **Titles and Notes:** Titles and notes should be embedded together with the date mentioned on sheet.
- **Check:** Make a last check after completing the draw. Do it carefully.

Ask



- You could ask what are the systematic order of application should be followed for both idea sketches and sketches from objects
- You could ask about the quadrants

Notes for Facilitation



- You could ask why orthographic projection method is used.

5.4.2: Engineering drawing standards

Say



- Engineering drawings, being one of the many types of specialized form of exchanging information, need to satisfy some acknowledged guidelines and ISO standards.
- ISO most prescribed paper sizes for specialized drawings are known as A-FORMATS.
- In technical drawings, various type of lines and line styles are used to provide the desired information.
- Dimensions express the appropriate sizes of features. Distances might be shown with either of two accepted forms of dimension: ordinate and linear.

Elaborate



Distances might be shown with either of two accepted forms of dimension: ordinate and linear.

- In **linear dimensioning**, two parallel lines, also known as “extension lines,” separated at the distance between two components, which are shown at every element. A line perpendicular to the extension lines, known as “dimension line,” is appeared between and ending at the extension lines. The distance is shown in numerical form at the midpoint of the dimension line.
- In **ordinate dimensioning**, an origin is established between one horizontal and one vertical extension line for the complete object view. The small circles placed at the ends of these lines shows the origin of line. Measurements along the x- and y-axes are shown by these extension lines, with the distances written in numerical form at the ends of these lines.

Typical standards of lines are summarized below.

- **Visible** – these are sequential lines used to represent edges which can be seen directly from a specific angle?
- **Hidden** – these lines are used to represent edges which can't be seen directly.
- **Center** – These lines are used to represent the axes of circular features. These lines are long and short dashed.
- **Cutting plane** – are lines that used to define sections for section views, these are thin and medium dashed lines, or also thick, long and double short-dashed lines.
- **Section** – These are thin lines, represent section views which results due to cutting of object. These are also known as “cross-hatching.”

- **Phantom** – These lines indicates feature or component of the assembly which is not the described part or assembly. These lines are alternately long and double short-dashed thin in shape.

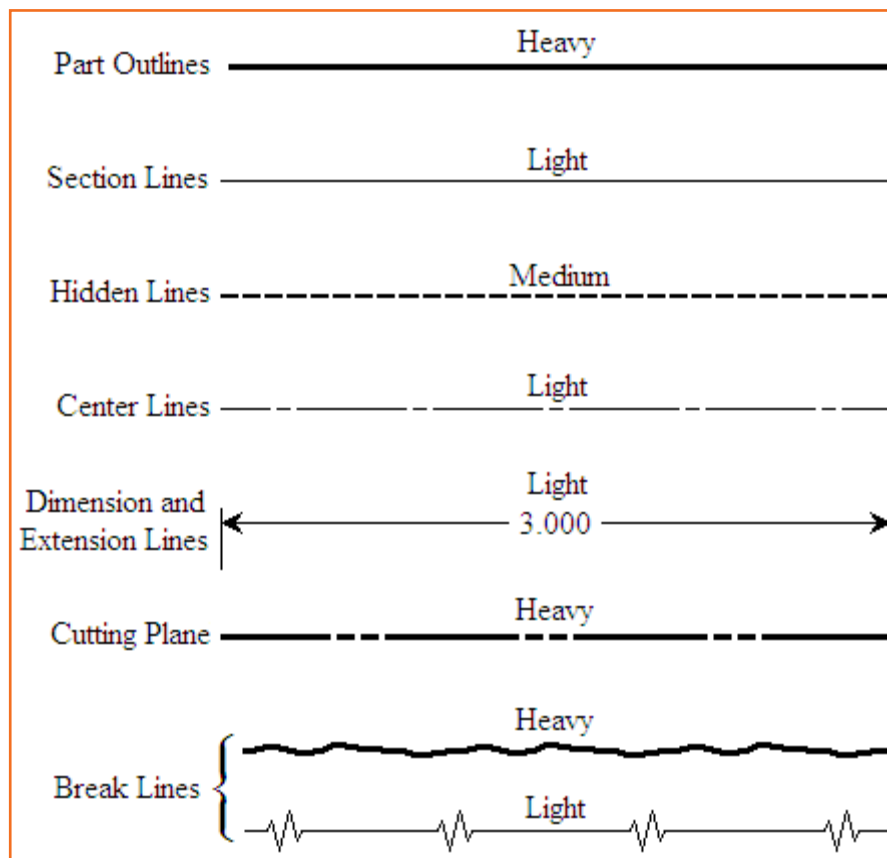


Fig 5.4.4: Different types of lines

Ask



- You could ask the standardized form of dimension
- You could ask what are the Basic drawing tools and equipments dimensioning
- You could ask about the different lines used in engineering drawing

UNIT 5.5: Electronic Symbols

Unit Objectives

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

1. Know about various electronic symbols

Say


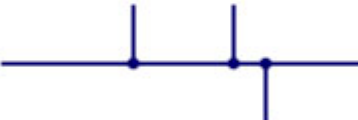
- Explain the description and components of following term:

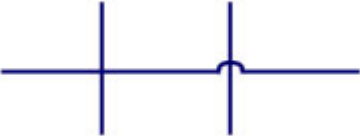
- o Wires
- o Power Supplies
- o Resistor
- o Capacitor
- o Diode
- o Transistor
- o Meters
- o Sensors
- o Switches
- o Audio and Radio Devices
- o Output Devices

Do








- Show them all the symbols on whiteboard

Wires




Electronic Component	Circuit Symbol	Description
Wire		Used to interface one segment to another.
Wires Joined		One gadget might be associated with another through wires. This is spoken to by drawing “blobs” on the point where they are shorted.

Un-joined Wires		At the point when circuits are drawn a few wires may not touch others. This must be appeared by crossing over them or by drawing them without blobs. In any case, connecting is usually rehearsed as there won't emerge any perplexity.
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Power Supplies

Electronic Component	Circuit Symbol	Description
Cell		Used to provide a provision to a circuit.
Battery		A battery has more than a cell and is utilized for a similar reason. The littler terminal is negative and the bigger one is positive. Shortened as "B".
DC Supply		Utilized as a DC power supply, that is, the current will dependably stream one way.
AC Supply		Utilized as AC power supply, that is, the current will continue exchanging directions.
Fuse		Utilized as a part of circuits where a likelihood of extreme current streams. The fuse will break the circuit if exorbitant current streams and spares alternate gadgets from harm.
Transformer		Utilized as an ac power supply. Comprises of two loops, the primary and secondary that are connected together through an iron center. There is no manual association between the two coils. The guideline of common inductance is utilized to get power. Truncated as 'T'.
Earth/Ground		Utilized as a part of electronic circuits to speak to the 0 volts of the power supply. It can likewise be characterized as the real earth, when it is connected in radio circuits and power circuits.


Resistor




Electronic Component	Circuit Symbol	Description
Resistor		A resistor is utilized to confine the measure of current course through a gadget. Condensed as 'R'.
Rheostat		A rheostat is utilized to control the current stream with two contacts. Pertinent in controlling light brightness, capacitor charge rate, and so on.
Potentiometer		A potentiometer is utilized to control the voltage stream and has three contacts. Have applications in changing a mechanical edge change to an electrical parameter. Curtailed as 'POT'.

Capacitor

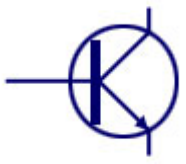
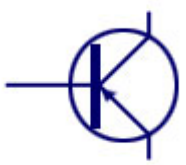


Electronic Component	Circuit Symbol	Description
Capacitor		Capacitor is a gadget that is utilized to accumulate electrical energy. It comprises of two metals plates that are isolated by a dielectric. It is relevant as a filter, that is, to restrict DC signals and permit AC signals. Contracted with the letter 'C'.
Capacitor – Polarized		Capacitor can be utilized as a part of a clock circuit by including a resistor.
Variable Capacitor		Used to shift the capacitance by turning the handle. A sort of variable capacitor is the trimmer capacitor that is little in estimate. The documentations are all the same.



Diode

Electronic Component	Circuit Symbol	Description
Diode		A diode is utilized to enable electric current to stream in just a single heading. Shortened as 'D'.






Light Emitting Diode (LED)		LED is utilized to discharge light when a current is gone through the gadget. It is curtailed as LED.
Zener Diode		After a breakdown voltage, the gadget enables current to stream in the turnaround course also. It is contracted as 'Z'.
Photo Diode		Photodiode fills in as a photo detector and changes over light into its comparing voltage or current

Transistor



Electronic Component	Circuit Symbol	Description
NPN Transistor		This is a transistor with a layer of P-doped semiconductor settled amid two layers of N-doped semiconductors that go about as the emitter and collector. Abridged as 'Q'.
PNP Transistor		This is a transistor with a layer of N-doped semiconductor settled between two layers of P-doped semiconductors that go about as the emitter and collector. Contracted as 'Q'.
Phototransistor		The working of a phototransistor is like that of a bipolar transistor with a distinction that it changes over light into its corresponding current. The phototransistor can likewise go about as a photodiode if the emitter is not associated.
Field Effect Transistor		A FET has three terminals: Gate, Source and Drain. FET has an electric field which controls the conductivity of a channel in a semiconductor substance.

N-Channel Junction FET		The Junction Field Effect Transistor (JFET) is the least difficult kind of FET with applications in Switching and voltage variable resistor. In an N-channel JFET an N-sort silicon bar has two littler bits of P-sort silicon material diffused on each sides of its center part, shaping P-N junctions.
P-Channel Junction FET		P-channel JFET is comparable in development to N-channel JFET with the exception of that P-sort semiconductor base is sandwiched between two N-sort junctions. For this situation dominant part carriers are gaps.





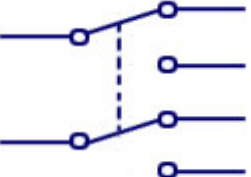
Meters

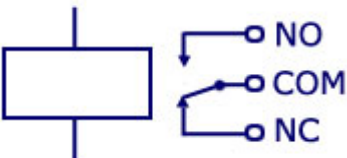
Electronic Component	Circuit Symbol	Description
Voltmeter		Voltmeter is utilized to gauge the voltage at one point in the circuit.
Ammeter		An Ammeter is utilized to gauge the current that goes through the circuit at a specific point
Galvanometer		A galvanometer is utilized to quantify little currents in the request of 1 milli ampere or less.
Ohmmeter		Resistance of the circuit is estimated utilizing an Ohmmeter.
Oscilloscope		An oscilloscope is utilized to quantify the voltage and era of signs alongside their shape display.

Sensors


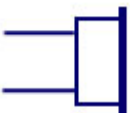


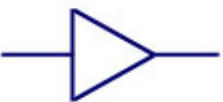
Electronic Component	Circuit Symbol	Description
Light Dependent Resistor (LDR)		It is shortened as LDR. Light Dependent Resistor is utilized to change over light into its corresponding resistance. Rather than straightforwardly measuring the light, it detects the warmth substance and changes it onto resistance.
Thermistor		Rather than straightforwardly measuring the light, a thermistor detects the warmth substance and changes it into resistance. Shortened as "TH".

Switches



Electronic Component	Circuit Symbol	Description
Push Switch		This is a common switch that passes current just upon pushing.
Singe Pole Single Throw Switch		Otherwise called the ON/OFF switch. This switch permits the stream of current just when it is continued. Abridged as SPST.
Single Pole Double Throw Switch		Otherwise called the 2-way switch. It can be likewise called as an ON/OFF/ON switch as it has an OFF position in the inside. The switch causes the stream of current in two ways, contingent upon its position. It can be condensed as SPDT.
Double Pole Single Throw Switch		Abridged as DPST. Can likewise be called as a double ON-OFF switch. This is utilized to disengage between the live and unbiased associations in the primary electrical line.
Double Pole Double Throw Switch		Contracted as DPDT. The switch utilizes a focal OFF position and is connected as switching switch for engines.





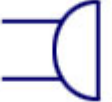
Relay		Relay is used to protect the circuit from overcurrent.
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Audio and Radio Devices

Electronic Component	Circuit Symbol	Description
Microphone		This gadget is utilized for changing over sound to its relating electrical energy. Contracted as 'MIC'.
Earphone		Does the turnaround procedure of amplifier and changes electrical energy into sound.
Loudspeaker		Does likewise operation as a headphone, however changes over an increased variant of the electrical energy into its subsequent sound.
Piezo-Transducer		It is a transducer that changes electrical energy into sound.
Amplifier		Used to open up a signal. It is primarily used to speak to an entire circuit instead of only one part.

Output Devices

Electronic Component	Circuit Symbol	Description
Lighting Lamp		This is utilized to give light to the yield.
Indicator Lamp		Used to change over electrical energy into light. The best case is the notice light on a car dashboard.

Heater		This transducer is utilized to change electrical vitality into warm.
Inductor		Inductor is utilized to create an attractive field when a specific current is gone through a loop of wire. The wire is wound on a delicate iron center. Have applications in engines, and tank circuits. Shortened as 'L'.
Motor		This gadget is utilized to change over electrical energy into mechanical energy. Can be utilized as a generator too. Curtailed as 'M'.
Bell		Utilized to deliver a sound as the output, as indicated by the electrical energy created as the data.
Buzzer		It is utilized to deliver a output sound relating to the electrical energy in the info.



6. Assembling of components

Unit 6.1 – Electrical wiring

Unit 6.2 – Cable wiring

Unit 6.3 – Assembling procedure

Unit 6.4 – Software selection and loading



ISC/N1101

Key Learning Outcomes

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

1. Know about electrical wiring.
2. Know about methods and techniques of cable assembly
3. Know about wire stripping and crimping process
4. Know about soldering process
5. Know about ways of securing wires in the assembly
6. Know about PCB assembling procedure
7. Know about assembling electronic component with mechanical equipment process
8. Know about software selection and loading

UNIT 6.1: Electrical Wiring

Unit Objectives

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

1. Know about electrical wiring.
2. Know about various methods used for securing electronic wiring
3. Know about heat shrink sleeves, strapping, cable ties and p-clips
4. Know about wiring diagram

Resources to be Used

- Available objects such as a duster, pen, notebook, bearings, cleaning solution and equipments, pulling equipments, etc.

Do

- Welcome and greet the participants. Revise the learning of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students about the understanding of electrical wiring.
- Invite students to participate. List the responses from students on the whiteboard.
- Give the students a brief overview of what all will be covered in the program.

6.1.1: Electrical Wiring color code

Say

- Electrical wires follow standard color coding that helps classify each wire function in the circuit.

Elaborate

In India wires are RGB mode i.e. Red- Green- Black. There are different functions of these RGB wire:

- Red** – The phase in electric circuit is defined by red wire. Red wire cannot be connected to another red or black wire because it is the live wire. In some types of switch leg the red wire is used.
- Black** – The neutral wire in electric circuit is defined by black wires. Inside an electric panel the neutral wires are joined to neutral bus bar.
- Green** – For grounding/earthing in electric circuit a green wire is used. This wire should be joined to green wire only (no other wire).

Type of Wire	Colour
Neutral	Black
Earth	Green or Green and Yellow
Phase	Red or Yellow or Blue

Ask

- What does RCB stands for?
- What are the colors of different types of wire?
- You could ask the function of Red, Black and Green wire.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.1.2: Standard cable and wire sizes Say

Say

- IEC 60228 is the International Electro-technical Commission's international standard on conductors of insulated cables. Among other things, it defines a set of standard wire cross-sections:

International standard wire sizes (IEC 60228).

International standard wire sizes (IEC 60228)					
0.5 mm ²	0.75 mm ²	1 mm ²	1.5 mm ²	2.5 mm ²	4 mm ²
6 mm ²	10 mm ²	16 mm ²	25 mm ²	35 mm ²	50 mm ²
70 mm ²	95 mm ²	120 mm ²	150 mm ²	185 mm ²	240 mm ²
300 mm ²	400 mm ²	500 mm ²	630 mm ²	800 mm ²	1000 mm ²

Ask

- What does IEC stands for?
- You could ask the meaning of International standard wire?

6.1.3: Securing electronic wiring

Say

- To secure electric wire following components has to install on wire i.e. Heat shrink sleeve, strapping, cable ties, P-clips etc.

Elaborate

Securing electronic wiring as follow:

- **Heat shrink sleeve** is a shrinkable plastic tube used for insulate wires, giving scrape resistance and environmental security for stranded and connections, solid wire conductors, joints and terminals in electrical work.
- **Strapping** - Bundling and banding are also known as strapping, to grip, association, strengthen, or fasten a strap is applying to an item.
- **Cable ties**
A hose tie, or zip tie is also known as a cable tie or tie-wrap, it is a type of fastener for grip items collected, primarily electric cables or wires.
- **P-clips**
 - These clips clamp the wire bundles having 16 to 50 mm diameter.
 - It offer good resistance to corrosion, ageing, and UV radiation and have good dielectric stuffs.
 - Ideal for interior/ exterior installation work and for use with electrical equipment.

Ask

- You could ask the meaning of securing electronic wiring.
- You could ask the student about Heat shrink sleeves and Strapping?

6.1.4: Wiring diagram

Say

- It is a basic straight pictorial demonstration of an electrical circuit.

Elaborate

This is the drawing which shows all the wiring between the parts, such as:

- power supplies and earth connections;
- control or signal functions;
- Interconnection via terminal posts, plugs, blocks, lead-through, sockets.
- termination of unused leads, contacts;

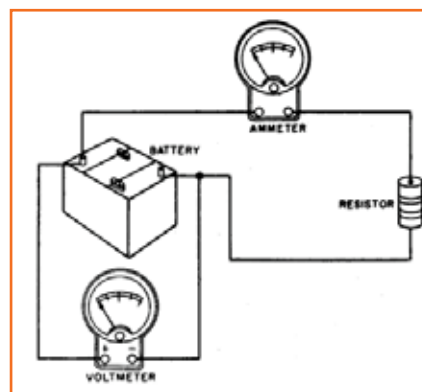


Fig 6.1.1: Wiring diagram

Read wiring diagram

Whether you are working with a vehicle, appliance, or light fixture, knowing how to read a wiring diagram will help you prevent personal injury or damage to the object on which you are working.

1. **Find the wiring diagram.** With appliances and other objects the wiring diagrams are often given.
2. **Check your voltage (V).** Check voltage requirements of the equipment.
3. **Learn the symbols.** It will be a great help by understanding the symbols in your wiring diagram meaning that will help you discover dissimilar electronic components and wiring networks with the mechanical equipment. Symbols usually look like the part they showing.
4. **Know the color code.** Representation of different components can be done by different colors of wires. For the testing of dissimilar components within the system become simple. For all electrical items there will be a specific colors for a home electrical system are same.
 - White wires are neutral and they take power back to the service panel.
 - The ground wires are green or bare wires. In the case of neutral wires fail these carry power back to the service panel.
 - For the representation of hot wires, colors like Black, red, blue are used. These are the ones that carry power to the object with which you are working.
 - If you are not confirming what the dissimilar colors mean then use a voltage tester.

Ask



- What does Black, red, blue color indicates?
- Which wire works as Neutral?
- What you understand by read wiring diagram?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.1.5: Wiring schedule

Say

- This defines the wire orientation number, type (dimension and number of conductors), length and the quantity of insulation stripping obligatory for soldering.

Schedule: Motor Control					
Wire No	From	To	Type	Length	Strip Length
1	TB 1/1	CB1/1	16/0.2	600 mm	12 mm
2	TB 1/2	CB1/2	16/0.2	650 mm	12 mm
3	TB 1/3	CB1/5	16/0.2	600 mm	12 mm
4	TB 1/4	MC/A1	16/0.2	800 mm	12 mm
5	TB 1/5	CH/1	16/0.2	500 mm	12 mm

Ask

- You could ask about the wiring schedule.

6.1.6: Wire run list

Elaborate



A wire run list is a form/to list for each wire and cable wire in the design. It typically includes the reference designator and pin name or number for each end of the wire, and the wire part number and length information.

WIRE RUNNING LIST					
WIRE NO.	TERMINATION		WIRE NO.	TERMINATION	
	FROM	TO		FROM	TO
1	CB1 (—)	R6-1	31	CR11 (+)	R3-2
2	CB2 (—)	R2-1	32	CR12 (+)	R7-2
3	CB3 (—)	CR3 (+)	33	J1 (—)	W4
4	CB4 (—)	CR4 (+)	34	J2 (—)	W4
5	CB5 (—)	CR5 (+)	35	J3 (—)	W4
6	CB6 (—)	CR6 (+)	36	J4 (—)	W4
7	CB7 (—)	CR7 (+)	37	J5 (—)	W4
8	CB8 (—)	CR8 (+)	38	J6 (—)	W4
9	CB9 (—)	CR9 (+)	39	J7 (—)	W4
10	CB10 (—)	CR10 (+)	40	J8 (—)	W4
11	CB11 (—)	R3-1	41	J9 (—)	W4
12	CB12 (—)	R7-1	42	J10 (—)	W4
13	J1 (+)	R1-1	43	J11 (—)	W4
14	J2 (+)	R5-1	44	J12 (—)	W4
15	J3 (+)	CR3 (—)	45	K1-X2	K1-A1

Ask



- You could ask about the wire run list.

UNIT 6.2: Cable assembly

Unit Objectives

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

1. Know about methods and techniques of cable assembly.
2. Know about procedure of cable assembly
3. Know about stripping and crimping of wires
4. Know about wire identification marking method
5. Know about soldering process

Resources to be Used

- Invigilator can use the available objects such as a marker, duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students about the cables.
- Invite students to participate. List the responses from students on the whiteboard.
- Give the students a brief overview of what all will be covered in the program.

6.2.1: Cable assembly

Say

- A cable assembly is a group of cables or wires that are arranged into a single unit. Cable assembly is an assembly of wires or cables which transmit signals or electrical power. The cables are bound jointly by straps, cable lacing, cable ties, electrical tape, sleeves, conduit, or a combination thereof.
- Binding the cables and wires and into a cable harness, secures the wires from adverse effects of abrasions, vibrations and moisture. Binding the wires into a non-flexing bundle, usage of space is optimized and the risk of a short circuit is decreased. Binding the wires into a heat shrink sleeve also lowers the risk of electrical fires.

Elaborate

Cable assemblies are designed according to geometric and electrical requirements. Wiring diagram provides the instructions for the assembly preparation and assembly.

1. Firstly cut the wires into required extent taken after by a marking procedure (both manually or preset) for recognition use.
2. Then, the wires are uncovered to expose their metal centers and gathered jointly via whichever additional terminals or connectors housings essential.
3. Then the bundle is fixed together to a structure panel or assembly installation.
4. The completed mass is then fixed by whichever defensive sleeves, conductor or expelled yarn.

Tools and equipments require for cable assembly



Fig 6.2.1: Tools and material required for crimping

Do

- Show the tools and equipments for cable assembly
- Show the procedure of cable assembly

Ask



- What do you understand by cable assembly?
- What are the different casings to creating the cable assembly?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.2.2: Wire stripping

Say

- **Stripping** a wire is the process of removing the insulator from the end of a wire, usually done to connect that wire to other wires or electrical parts. It requires a wire stripper.
- For cable assembly, the first step is to strip the wire. Put the wire through the right sized hole and squeeze the handle. The tool grabs the wire and then pulls the end off. Strip the wire so that there is just enough to fit into the crimp area of the terminal.

Demonstrate

Procedure for using a wire stripper

Step1: Recognize the gage of the wire (more often than not imprinted as an afterthought).

Step2: Coordinate the gage amid the proper hole on the wire stripper. The hole would be checked.

Step3: Then the wire stripper handles need to be open. “Seat” the wire on one side of the hole.

Step4: Gradually push the handles jointly in anticipation of the point that they can go no more distant.

Step5: Extremely essential: softly turn the wire inside the hole (or the wire stripper around the wire either is less complicated). The worker doesn’t need to rotate far-off: only a quarter hands over one bearing and back.

Step6: Drag off the “cut” end of the wire casing.

Step7: Once the wire is stripped, there will be about 1/4” (0.5 cm) of bare metal wire exposed.



Fig 6.2.2: Wire stripping

Ask



- You could ask the meaning of Stripping.
- What are the procedures for using wire stripper?
- You could ask the students about stripper along with their procedures.

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Wire stripping	1 hours	Wire
		Wire stripper

Do



- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.2.3: Inserting heat shrink

Say



- If the wire is made up of many smaller strands twisted together, gently maneuver the strands so they are all lying to form a smooth cylinder. If the wire is a solid conductor wire, this will not be necessary.

Demonstrate



Placing heat shrink



Step1: Utilize heat shrink tubing to protect the graft.

Step2: removed a bit of tubing about twice the length of the zone of the join.

Step3: Slide it on to the finish of both of the wires.

Step4: Drive it up the wire off the beaten path of the graft with the goal that it is not rashly warmed by the joining operation.

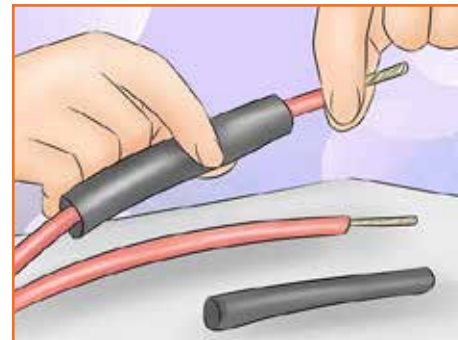


Fig 6.2.3: Inserting heat shrink

Ask



- Ask about procedure of placing heat shrink.

6.2.4: Crimping

Say

- **Crimping** is a way of making electrical connections that doesn't require solder. It protects wires exposed ends and can be used to connect wires to each other or to other electrical parts. It requires a wire crimper.

Demonstrate

Procedure for crimping

1. First select a properly-sized crimp connector. Place the connector into the crimper.
2. Place the stripped wire end inside the cylindrical plastic end of the crimp connector.
3. Take the crimpers and place the blunt part of the crimpers over the place you want to crimp.
4. Once you have crimped the wire a first time, crimp the wire a second time at 90° (a quarter turn) to the first crimp, and farther from the connector head.
5. Now, slide the heat shrink over the crimp and heat it by using heat gun until it closes tight.
6. It's not always necessary, but if your wiring connection will be subject to moisture or excessive movement and vibration, it's a good idea to tape the connection.

Ask

- What is the meaning of Crimping?
- You could ask the procedure of crimping?

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.2.5: Cable terminal making

Say

- The identification of wire bunch and harnesses is turning into a typical practice and might be expert by the utilization of a checked sleeve tied set up or by the utilization of weight sensitive tape.
- Adaptable sleeving, any clear or hazy, is suitable for normal utilize. At the point while shading coded or striped segment wire is utilized as a major aspect of a cable, the recognizable sleeve ought to indicate which shading is related to which wire recognizable proof code.
- **Terminal marking sleeve and tags:** Typical cable markers are level, nonheat-shrinkable labels. heat shrinkable checking sleeves are accessible for marking wires and cables, and ought to be embedded over the correct wire or cable and warmth contracted utilizing the best possible producer suggested heating apparatus.

Elaborate

Methods of marking wire or cable are as follow:

- a) **Direct marking** is completed by printing the cable external covering.
- b) **Indirect marking** is completed by printing a heat shrinkable sleeve and introducing the printed sleeve on the wire or links external covering.

Marking methods

1. **Hot stamp marking:** Hot stamp prepare utilizes a heated typeface to exchange shade from a strip or thwart to the surface of wires or cables. The conventional strategy engraves hot ink marks onto the wire.
2. **Ink jet marking:** it is a “non-affect” marking technique where the ink beads are electrically charged and after that guided onto the moving wire to frame the characters. Two essential ink sorts are accessible: thermal cure and UV cure.
3. **Laser marking:** Of the assortment of laser marking machines, UV lasers are turned out to be the finest. This technique marks into the exterior of the wire’s protection without corruption to its execution.

Identification sleeves are normally used for identifying the following types of wire or cable:

- **Unjacketed** shielded wire.
- **Thermocouple** recognition is usually skilled through way of ID sleeves.
- **Coaxial cable** ought not to be hot stamped straightforwardly. While marking coaxial cable, protection ought to be taken not to distort the cable because this could modify the electrical attributes of the cable.
- **Multi-conductor cable** utilize ID sleeves in favor of identify unprotected, unjacketed cable.
- **High-temperature wire** through insulation is hard to mark (such as Teflon and fiberglass).

Marker sleeve installation after printing

- a) Hold marker, the printed side must be hold towards upwards, and then push end of wire on lip of sleeve to open sleeve.
- b) Where wire is stripped, utilize a piece bit of unstrapped wire to open the finish of the marker.
- c) Press sleeve onto wire with a delicate contorting movement.
- d) Shrink marker sleeve, utilizing heat weapon with shrivel tubing connection.

Ask

- What do you understand by Terminal marking sleeve and tags?
- What is direct marking and indirect marking?
- Why the identification sleeves are used?

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.2.6: Soldering

Say

- Soldering is a process in which two or more metal items are joined together by melting and then flowing filler metal into the joint—the filler metal having a relatively low melting point.
- Soldering is utilized to shape a lasting association between electronic segments.
- Most of the solder metals are the alloy of tin and lead.
- Hand Soldering: Hand Soldering is done physically utilizing solder iron. Little joints are made by along these lines in brief term period around in one second.
- Wave Soldering: Wave soldering is a method which permits different lead wires to be soldered to a PCB as it disregards an influx of liquid bind.
- Re-flow Soldering: This procedure is additionally broadly utilized as a part of hardware to gather surface mount segments to print circuit sheets. In this procedure patch glue comprising of weld powders in a flux cover is connected to spots on the board where electrical contacts are to be made between surface mount segments and the copper circuit.
- The motivation behind flux is to encourage the soldering procedure. One of the deterrents to an effective solder joint is pollution at the site of the joint, for instance, dirt, oil or oxidation.
- The most common type of flux used in electronics (soft soldering) was rosin-based, using the rosin from selected pine trees.
- It was non-corrosive and non-conductive at normal temperatures but became mildly reactive (corrosive) at the elevated soldering temperatures.

Elaborate

Types of solder

- **Lead-based solder-** Solder comprising of lead was all around utilized as a part of the past. It was made of a blend of tin and lead. Generally a 60/40 (tin/lead) blend, that melts at around 180-190C degrees.
- **Lead-free solder-** Lead-free solder is solder that do not use lead. EU requires financially accessible gadgets to utilize sans lead solder (RHoS) due to the wellbeing risks of lead.

Fluxes for soft solder are currently available in three basic formulations:

- **Water-soluble fluxes** - higher movement fluxes intended to be evacuated with water in the wake of soldering.
- **No-clean fluxes** - sufficiently mellow to not “require” expulsion due to their non-conductive and non-destructive deposit. These fluxes are called “no-clean” on the grounds that the deposit left after the solder operation is non-conductive and will not lead to any electrical shorts; all things considered they leave an obviously unmistakable white buildup that looks like weakened fledgling droppings.

- **Traditional rosin fluxes** - accessible in non-initiated (R), somewhat enacted (RMA) and actuated (RA) details. RA and RMA fluxes contain rosin consolidated with an activating operator, ordinarily a corrosive, which expands the wettability of metals to which it is connected by evacuating existing oxides.

Materials and equipment for soldering

- o A soldering iron
- o Solder
- o Sponge
- o Stand on which to hold the hot soldering iron
- o Solder braid
- o Prototype board
- o Steel wool or fine sandpaper
- o Crocodile clips

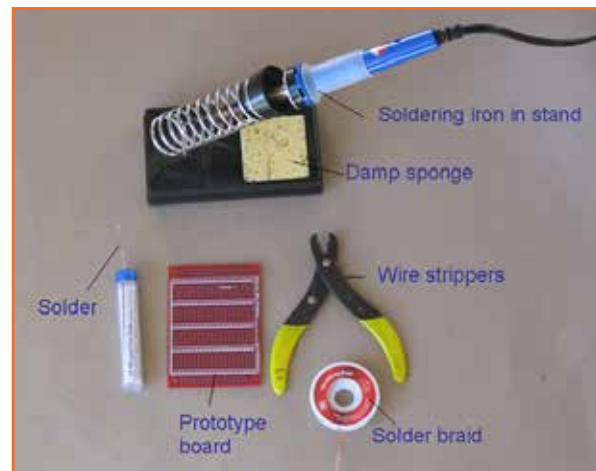


Fig 6.2.4: Soldering equipments

Soldering of two wires

1. Start with tinning the two wires. It is useful to have something to hold one wire for you. Place the tip of the iron on the wire and let it heat for a second or three. Then add some solder until the wire is soaked with solder. If it is a thick wire, you should turn up the heat on your iron (if possible) to make the wire heat up faster. Repeat the tinning process on the other wire.

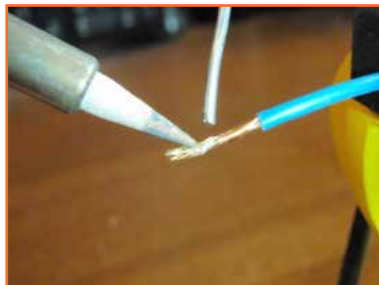


Fig 6.2.5: Soldering of two wires



2. Now place the two tinned wires together and hold still while heating them with the soldering iron so that the tin on both of the wires melt together.



Fig 6.2.6: Soldering of two wires



Demonstrate

Set out and termination of fiber optic cable

Steps

Step1: The devices you will require:

- Fiber stripper
- Ruler
- Marker
- Crimper

Step2: Determine from the finish of the fiber to 40 mm and confirm the cable.



Step3: Slip the strain-relief boot on top of the cable.



Step4: Make beyond any doubt the stripper's cutting face is spotless. Utilize the front, substantial V-indent on the cable stripper to evacuate the 900-micron tight buffer.



Step5: Carefully clip down on the cable mostly down from the check you made.



Step6: Maintaining the pressure light, precisely slide the coat off of the fiber. Be mindful so as to abstain from breaking the delicate glass fiber. Rehash venture to evacuate the rest of the 20 mm of coat.



Step7: Carefully expel any of the remaining 250-micron covering (see the white utilizing the littler, back V-notch on the instrument).



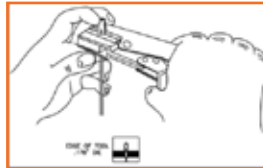
Step8: Cleanse the uncovered fiber with two passes of a fiber wipe hosed with fiber optic cleaning liquid. Try not to touch the uncovered fiber in the wake of cleaning it.



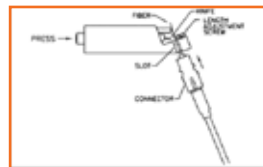
Step9: Slide an orange sleeve over the uncovered optical fiber onto the coat of the fiber cable. Push the sleeve until the end nearest to the uncovered fiber is flush with the finish of the coat.



Step10: Slide the extensive end of the fiber connector body (ferrule) onto the stripped end of the fiber cable and up finished the orange sleeve. Push it onto the cable to the extent that it will go.



Step11: Now utilize the crimping instrument to crimp the ferrule against the fiber cable. On the off chance that the crimping apparatus jaws are not completely open, gradually crush the handles until the point when the jaws completely close. Keep pressing until the point when the latch system discharges, enabling the jaws to open totally.



Step12: Place the huge end of the ferrule in the crimp device jaws and gradually press the handles of the crimp device until the jaws simply reach it. Try not to apply any more weight on the handles.

Step13: While ensuring that the fiber cable and connector don't go out of their place, gradually press the handles to close the jaws until the point that the instrument bottoms and springs open. The crimp is presently done.

Step14: Slip the strain relief boot in the direction of the finish of the connector.

Step15: Position the hot blade edge against the side of the protruding fiber, just past the tip of the connector and removed all the overabundance fiber.

Step16: Insert the fiber ferrule on the finish of the connector you just collected into the adapter of the inspection microscope. Gaze through the eyepiece and change the concentration and lighting of the magnifying lens until the point when you can plainly observe the tip end of the fiber. The finish of the fiber you are assessing can likewise be illuminated by pointing the inverse end at a light installation or open window if the sun is out.



Step17: Place the sandpaper confront up in the focal point of the glass polishing plate (the dark gray rough side is up). The container of polishing slurry needs to be wobbled well. Damp the sandpaper with a few drops of clean slurry in the middle of the sheet. Embed the ferrule of the fiber connector into the highest point of the polishing puck. Place the puck base side down on the cleaning extender with the goal that the tip of the fiber contacts the sandpaper.

Step18: Polish the finish of the fiber. After 20 strokes, clean the puck and the connector by wiping them off by cleaning arrangement.

Step19: Monitor the finish of the fiber ferrule with the help of microscope. Now try not to have the capacity to see the scratches left by the polishing film, aside from via cautious examination under the microscope.

Step20: After effective clean, collect dark coupling sleeve. To start with slide up the bend relief boot and embed the coupling sleeve over the white body. Arrange the sleeve, with the goal that the decreased side of the sleeve fits into the tapered body. The coupling sleeve should bolt into the right spot when legitimately situated. It ought to never be slide forward and backward with little resistance. Presently your assembly is finished.



Fig 6.2.7: Completion of fiber optic cable termination

Ask



- What is known as Soldering and their types?
- What are the three basic formulations of fluxes for soft solder?
- What are the equipments used for soldering?

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Terminal of fiber optic cable	2 hours	Fiber stripper
		Microscope
		Knife blade

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

UNIT 6.3: Assembling procedure

Unit Objectives

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

1. Know about PCB assembling procedure.
2. Know about assembling procedure with mechanical equipment

Resources to be Used

- Invigilator can use the available objects such as a Wire, light Bulb, battery, electric switch.

Do

- Welcome and greet the participants. Revise the learning's of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students about the understanding of assembly procedure.
- Invite students to participate. List the responses from students on the whiteboard.
- Give the students a brief overview of what all will be covered in the program.

UNIT 6.3.1: Assemble a printed circuit board (PCB)

Say

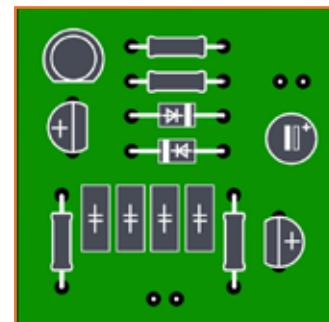
- Printed circuit boards (PCB) give various focal points to modern applications. Their minimally planned structure can hold all the little electronic parts together.
- Printed circuit boards are anything but difficult to introduce and repair because of their close-knit outline. Every one of these advantages originated from exact assembly of a printed circuit board.

Elaborate

1. **Choose the technology for the PCB,** it rely upon the innovation prerequisite, once the innovation is picked, the PCB experiences whatever is left of the assembly process.

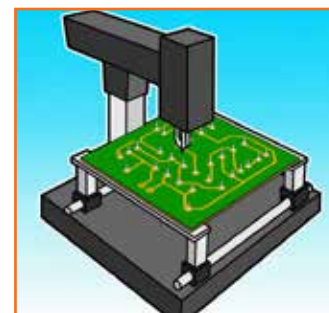


2. **Solder the components onto the board:** Use a lead or a tin patch to join the electronic parts to the printed wiring board.

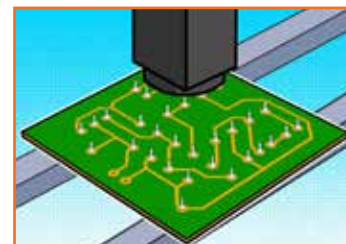


3. **Attach components according to the schematic pattern:** The circuit board comprises of a schematic drawing or example. The little segments should be picked and set holding to the example on the circuit board.

4. **Place the PCB in a soldering machine:** The welding machine is intended to legitimately join every one of the segments together on the circuit board. The soldering procedure additionally readies the PCB for the following piece of the assembly procedure.



5. **Test the PCB for Defects:** After assembly, the PCB is put through a detailed testing process. The most usually utilized process for testing and reviewing PCBs is Automated Optical Inspection (AOI). The optical machines check for free joints, over-welding on the circuit board, loose parts, and so forth.



Ask



- What is the full form of PCB?
- You could ask the technology used in PCB?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

UNIT 6.3.2: Assembling with mechanical equipment

Say



- There are many other mechanical parts used by manufacturers of electronic equipment.
- A large portion of them fall into the classification of exchanging or connecting circuits. Just the spacer falls into an alternate classification, called mounting.

Elaborate



- The switch is utilized to divert current or voltage starting with one circuit then onto the next.
- The wire nut is utilized to hold two contorted wires together and insulate them (keep them from being stripped and uncovered) in the meantime.
- The PC board male and female connectors are utilized to append wires from controls or different circuits to the printed circuit board.
- The spacer holds the printed circuit board far from the case to keep leads from shorting to the case.

Mounting on mechanical equipment

- There are various techniques for mounting printed circuit boards. The least difficult technique is utilizing machine screws and spacers.
- Associate the cable terminals into their legitimate connectors fitted in the mechanical gear.



Fig 6.3.1: Mechanical assembling

Ask



- What is the meaning of Mounting?
- What PC board male and female connectors are used?
- You could ask why switches are used.
- What are the different methods for mounting printed circuit boards?

UNIT 6.4: Software selection and loading

Unit Objectives

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

1. Know about software selection and loading of electronic assembly.

Resources to be Used

- Invigilator can use the available objects such as a Wire, light Bulb, battery, electric switch.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Notes for Facilitation

- You could ask the students about the software selection and loading.
- Invite students to participate. List the responses from students on the whiteboard.
- Give the students a brief overview of what all will be covered in the program.

6.4.1: Software selection and loading

Say



- Many electronic components and micro-electronic components have code loading mechanism and they require embedded software.
- The embedded software is of different types: closed platform with applications, open platform, native software etc. The Loader has a place with the embedded programming.
- **Embedded software** is computer software, written to control machines or devices that are not commonly thought of as PCs. It is normally specific for the specific equipment that it keeps running on and has time and memory imperatives.

Ask



- What is embedded software and how many types of embedded software?

6.4.1.1: Procedure for loading the software in machine

Say

- For uploading the embedded software in machine there is a specific procedure has to follow.

Demonstrate

Steps

Step1: Embedded software development

Software Development is performed on a Host computer

- Compiler, Assembler, Linker, Locator, Debugger
- Generates executable binary image that will keep running on Target Embedded System

Embedded Systems Programming needs an extra multifaceted software build progression

- Target hardware platform comprises of following:
 - Target hardware (processor, memory, I/O)
 - Runtime environment (Operating System)
- What is required for final deployment has been comprise by target hardware platform
- Target hardware platform doesn't comprise development tools (like compiler, debugger etc.)

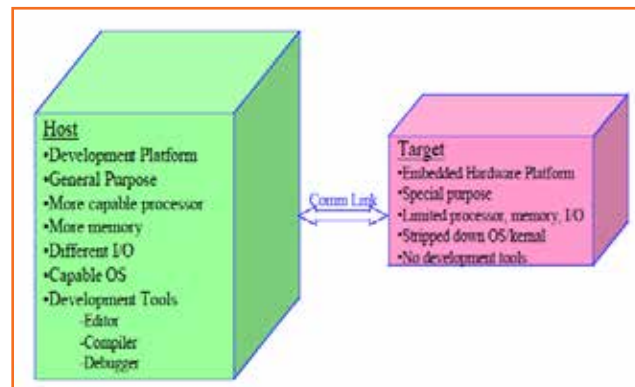


Fig 6.4.1: Developing embedded software

Target hardware platform is unique in relation to development platform

- Development platform, known as the Host Computer, is ordinarily a universally useful PC
- Host PC runs compiler, assembler, linker, locator to make a binary image that will keep running on the Target embedded framework.

Step2: For developing software for a general purpose computer

- Creation source file
- Typing of C code
- Build: compilation and linking
- Execution: loading and running

Step3: Compiling Embedded Systems

Compiler interprets program written in human understandable dialect into machine language

- Source Code --> Object file
- Object file is a binary file that contains set of machine- language guidelines (opcodes) and data as a consequence of language interpretation process

Step4: Linked embedded systems

Linker combines object files (from compiler) and resolves variable and function references

- Source code comprised file >1, which should be joined
- Resolve variables referenced in one file and defined in another file
- Library functions for resolve calls, like sqrt
- Comprise an operating system

Linker generates a “relocatable” version of software program

- Program is finished, aside from no memory addresses relegated

Step5: Locating Embedded Systems

- A Locator is the device that plays out the transformation from relocatable program to executable binary image
- The Locator allots physical memory locations to code and information segments inside the relocatable program
- The Locator delivers a binary memory picture that can be stacked into the target ROM
- In distinction, the operating system allocates the addresses at load time on general purpose computers.

Step6: Downloading and execution of program

- Once the program is compiled, linked and located effectively, move it towards the target platform
- Download the binary image to the embedded system
 - o Executable binary image is moved and stacked into a memory gadget on target board
 - o Can be loaded by a device programmer into ROM, which “burns” a chip which can be re-inserted into the embedded system
 - o When handy board is put into bootstrap download mode, then transfer the data via serial port into memory
- When resetting the processor, program is executed.

Ask



- You could ask the process of loading the software in machine?
- What is compiling embedded system?
- You could ask the process for developing embedded software?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

6.4.1.2: Checking functionality of the software

Say

Use debugging tools for checking the functionality of the software

1. Simulator
2. Remote debugger
3. Emulator in-circuit

Elaborate

1. **Debugging with Simulators:** A host-based program that suggests suitability and guideline set of target processor is known as Simulators.
 - Front-end has text or GUI-based windows for register contents, source code, etc.
 - Precious throughout early stages of development
 - It simulates processor only, not peripherals
2. **Debugging with Remote Debuggers:** They are used to monitor/control embedded software
 - Used to download, execute and investigate embedded software over correspondences (e.g., serial port)
 - Front end has GUI based windows or text for register contents, source code, etc
 - Backend gives low-level control of target processor, keeps running on target processor and conveys to front-end over comm-link
 - Debugger and programming being fixed are executing on two diverse PC frameworks
 - It supports superior level of contact between target and host
 - o Allows start/restart/kill, and stepping through program
 - o Software breakpoints (“stop execution if instruction X is fetched”)
 - o Read/write registers or data at particular address
 - It requires target processor to run more than final software package
3. **Debugging with In-Circuit Emulators:** In-Circuit Emulators (ICE)
 - Take the place of target processor
 - Contains duplicate of target processor, in addition to RAM, ROM, and its own particular installed programming
 - Allows you to inspect condition of processor while program is running
 - It used remote debugger for human interfacing

- It has more potential than target processor
 - o Supports software and hardware breakpoints (stop execution on memory and I/O read/write, interrupts) “Stop on write to variable num”
 - o Real-time tracing = Stores information about each processor cycle that is executed = Allows you to see what order things happened
- Disadvantage: Expensive!

Ask



- What is known as Logical error?
- What do you understand by Debugging?
- What are the tools for checking the functionality of the software for debugging.
- Name the expensive debugging function?
- What is the full form of ICE?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

ISC/N1101

Key Learning Outcomes

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

1. Discuss about Preliminary checks on the completed work
2. Know about Insulation resistance testing between housing assembly and interconnection wiring
3. Know about continuity test of all interconnections
4. Know about unwanted short circuits test between wires
5. Know about Oscilloscope testing

UNIT 7.1: Preliminary checks on the completed work

Unit Objectives

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

1. Discuss about Preliminary checks on the completed work
2. Know about Insulation resistance testing between housing assembly and interconnection wiring
3. Know about continuity test of all interconnections
4. Know about unwanted short circuits test between wires
5. Know about Oscilloscope testing

Resources to be Used

- Invigilator can use the available objects such as a Copper wire, insulation wire, LED light and millimeters etc.

Do

- Welcome and greet the participants. Revise the learning's of the previous sessions and ask them if they have any doubts.

7.1.1: Security of assembled and interconnected items

Say

- Assembly boards proposed for outrageous conditions frequently have a conformal covering, which is connected by plunging or spraying after the parts have been welded.
- The coat prevents corrosion and leakage currents or shorting due to condensation.
- The initial conformal coats were wax; These days conformal coats are normally plunges of dilute solutions of silicone elastic, polyurethane, acrylic, or epoxy.
- Many assembled boards and interrelated are static sensitive, and in this way should be put in antistatic bags amid transportation.

Tips

- Improper handling techniques might transmit an accumulated static charge through the board, damaging or destroying components.
- The chief disadvantage of conformal coatings is that servicing of the board is rendered extremely difficult.
- When handling these boards, the user must be grounded (earthed).

Ask

- What are the earlier conformal coatings?
- You could ask the students what are the new techniques for applying the conformal coating.
- You could ask the student about Assembled and Interconnected items.
- How coat prevents from corrosion.

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

7.1.2: Insulation resistance test

Say

- The insulation resistance (IR) test (also commonly known as a Megger) is a spot insulation test which uses an applied DC voltage.
- The measured resistance is intended to indicate the condition of the insulation or dielectric between two conductive parts, where the higher the resistance, the better the condition of the insulation.
- IR testers are portable, the IR test is often used in the field as the final check of equipment insulation and also to confirm the reliability of the circuit and that there are no leakage currents from unintended faults in the wiring.
- The IR test is its non-destructive nature.

Elaborate

- DC voltages do not cause harmful and/or cumulative effects on insulation materials and provided the voltage is below the breakdown voltage of the insulation, does not deteriorate the insulation.

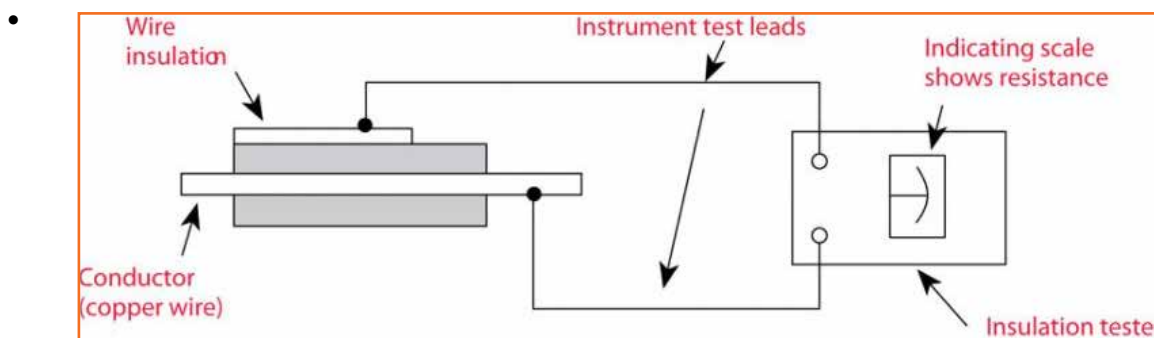


Fig 7.1.1: Insulation test

Test procedure

1. Firstly guarantee that the hardware to be tried and the work range is secure, e.g. hardware is de-stimulated and disconnected, all the significant work grants have been endorsed and all locks / tags.
2. Next, release capacitances on the equipment (particularly for HV hardware) with static release sticks or an IR analyzer with programmed releasing abilities.
3. The leads on the IR analyzer would then be able to be associated with the conductive parts of the gear. For instance, for a three-cores and earth link, the IR test would be connected between cores (Core 1 to Core 2, Core 1 to Core 3 and Core 2 to Core 3) and between each core and earth. Correspondingly for three-stage engines, circuit breakers, switch disconnections, and so forth the IR test can be connected at the equipment terminals (and earth association).
4. While applying an IR test to earth, it is great practice to inter- face the positive pole of the IR analyzer to earth with a specific end goal to stay away from any polarization impacts on the earth.

5. The IR analyzer is empowered once associated, for run of the basic test term of 1 minute. The IR test estimations are recorded following 1 minute.
6. After the IR test is done, release capacitances again for a time of 4-5 times the test span

Demonstrate



Steps for conducting insulation resistance test



- Step1:** Check the insulation tester by shorting its test leads. It should indicate zero resistance. On the off chance that test leads are kept open, it should demonstrate interminable resistance.
- Step2:** Isolate the segment to be examined from the power supply.
- Step3:** Disconnect all lights or electronic gadgets from the circuit to be examined.
- Step4:** Select the correct working voltage for directing the examination, contingent on the rating of the system.
- Step5:** Check for associations while leading examination so that lone the area to be tried is incorporated into the test.
- Step6:** There ought not to be any stray parallel spillage ways.
- Step7:** Check the instrument for pointer file or some other pre-change requirement.
- Step8:** Test prompts be utilized ought to have great quality insulation.
- Step9:** Before beginning the examination, safeguard that every one of the capacitors in the circuit are released by shorting their two leads together. Also, after the test guarantees that they are in release condition. In the event that this is not done they may give false readings.
- Step10:** Before touching link closes after examination, release any energy that may have been put away in the links amid the test. This is well on the way to happen in long keeps running of bigger links because of their capacitance.
- Step11:** Checking progression of an earthling framework requires the utilization of low-perusing ohmmeters, which ought to be zero-balanced before each test and adjusted on normal interims.
- Step12:** Where the testing of the earth electrode resistance is required (i.e., the resistance between the electrode and the general mass of earth), one of the uncommon sorts of earth-resistance analyzers must be utilized.

Ask



- What are the factors affecting test results?
- What is the meaning of Megger?
- What is the full form of IR?
- You could ask the test procedure for insulation resistance?

Notes for Facilitation

- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

7.1.3: Continuity test

Say



- A continuity test is the checking of an electric circuit to see if current flows.
- If electron flow is inhibited by broken conductors, damaged components, or excessive resistance, the circuit is “open”.
- Devices that can be utilized to perform progression tests incorporate millimeters which measure current and concentrated coherence analyzers which are less expensive, more essential gadgets, by and large with a basic light that lights up when current flows.

Demonstrate



How to test for continuity



Step1: Turn the dial to Continuity Test mode (𐀀𐀀𐀀). It will probably impart a spot on the dial to at least one capacities, normally resistance (Ω). With the test tests isolated, the multimeter's show may indicate OL and Ω .

Step2: If needed, press the progression key.

Step3: First embed the black test lead into the COM jack.

Step4: Then embed the red lead into the V Ω jack. Whenever completed, expel the leads backward request: red initially, then black.

Step5: With the circuit de-empowered, interface the test leads over the segment being tested. The position of the test leads is arbitrary. Note that maybe the part ought to be segregated from different segments in the circuit.

Step6: The digital multimeter (DMM) beeps if a total way (continuity) is distinguished. In the event that the circuit is open (the turn is in the OFF position), the DMM won't beep.

Step7: When completed, kill the multimeter to save battery life.

An interconnection between circuits is likely to be due to the following reasons:

- Incorrect termination of wires
- Result of insulation breakdown
- Incorrect association at field intersection box

Ask



- What are the devices can be used to perform the continuity test.
- What is the mode of continuity test?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

7.1.4: Short circuit test

Say

- A short circuit is an electrical circuit that allows a current to travel along an unintended path with no or very low electrical impedance.
- The electrical opposite of a short circuit is an “open circuit”, which is an infinite resistance between two nodes.
- A short circuit is an abnormal connection between two nodes of an electric circuit intended to be at different voltages.
- A short circuit is a connection between two nodes that forces them to be at the same voltage.

Demonstrate

Steps to conduct short circuit test

- Step1:** It is required to direct test between neutral conductors of every single other circuit and the dynamic conductor of a similar circuit at the mains supply appropriation to uncover any interconnection faults.
- Step2:** Before conduction of tests, perform the accompanying strides:
- Step3:** Disconnect neutral connection from circuit
- Step4:** Keep circuit protective
- Step5:** Close all contactors or switches.
- Step6:** Check every immediate interconnection with the low-go ohmmeter.
- Step7:** If resistance appeared in the ohmmeter is low then it shows a short out condition.
- Step8:** Suppose, the load is associated with an active phase and is neutral from various circuits, at that point it can be identified just with associated loads.
- Step9:** If these means are performed preceding of the test, at that point check the resistance between the neutral and the dynamic conductors.
- Step10:** To check for insulation resistance of links, bring insulation resistance with megger or insulation resistance analyzer, particularly if insulation breakdown is suspected.
- Step11:** If the resistance indicated is less than 1 M ω then one might say that the wiring or gadget terminal has a insulation issue.
- Step12:** To recognize each electrical circuit and it's dynamic and insulation conveyors, compute load resistance with the ohmmeter and as needs be, distinguish every dynamic and neutral transmitter.

Ask



- What is the meaning of short circuit?
- What is the abbreviation of short circuits?
- You could ask the steps to conduct short circuit test?

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

7.1.5: Oscilloscope

Say



- An oscilloscope, already called an oscillograph and casually known as an scope, CRO (for cathode-beam oscilloscope), or DSO (for the more present day computerized capacity oscilloscope), is a kind of electronic test instrument that permits perception of continually shifting signal voltages.
- Oscilloscopes are utilized to watch the change of an electrical signals after some time.
- The observed waveform can be investigated for such properties as sufficiency, recurrence, rise time, time interim, bending and others.
- A technician plans to utilize an oscilloscope to show an AC voltage signal. Subsequent to turning the oscilloscope on and associating the Y input test to the signal source a test point, this show shows up.

Ask



- What is the previous name of Oscilloscope?
- What is the full form of CRO and DSO?
- You could ask the techniques to use an oscilloscope?

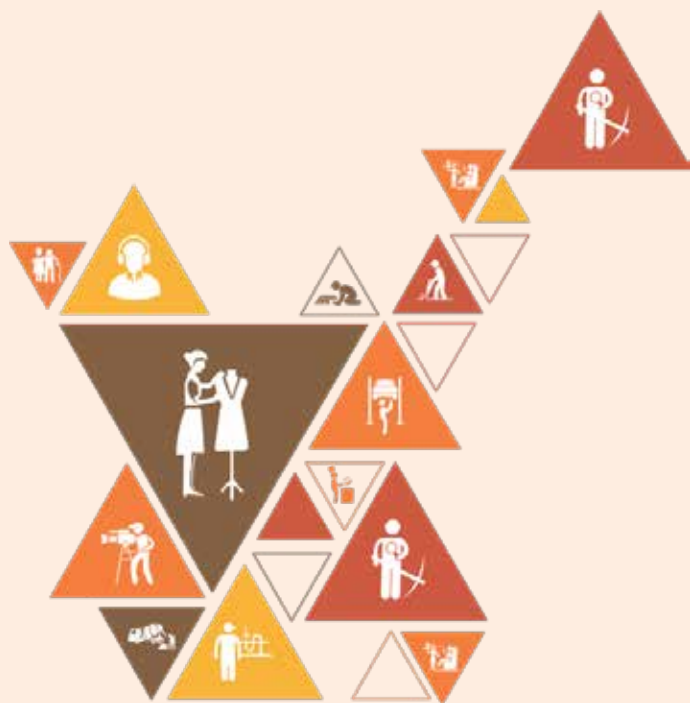
Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.



Unit 8.2 - Documentation of defects



ISC/N0008

Key Learning Outcomes

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

1. Know about reporting and documentation requirements
2. Know about accident reporting
3. Know about reporting of defective tools

UNIT 8.1: Documentation for health and safety

Unit Objectives

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

1. Discuss about accident and incident reporting
2. Know about how to write reports properly
3. Know about how to escalate the issues properly

Resources to be used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- It is of utmost importance to inform about the accidents and incidence straightaway, irrespective of the impact of it.
- Hazard reports can take a number of different forms:
 - o the standard hazard report used by workers for all hazards
 - o reports of infections
 - o near-miss incident reports
 - o reports of damage and faulty tools, equipments and machines
 - o routine inspection reports
 - o Behavior incident reports.
- Reporting of incidents and accidents is required under the Work Health and Safety (WHS) legislation
- Always report an accident to management immediately. There should be a form at each workplace that you (or the person involved) and any witnesses can fill out, where possible, otherwise it can be completed by a health and safety representative (HSR) if necessary.

Elaborate



The form should cover the following areas:

- Description of the occurrence – what was the event that occurred, which required this report to be completed?
- Nature of injury or disease – select the most appropriate description from a range of options.
- What injury or disease happened as a result of the occurrence?
- First aid, medical treatment or hospital admission – this section asks for a description of what was done to treat the injury or disease.
- Part of the body affected – tick off which part or parts of the body were affected as a result of the occurrence.
- Source of injury – what actually caused the person to be injured or acquire a disease? This could be a piece of machinery or other hazardous materials for example.
- Probable cause or causes of injury – how was the source listed above actually responsible for the injury?
- Investigation – this asks a series of questions that seek to find out why the person has been injured or has acquired a disease.
- Notification checklist – this checklist makes sure that everyone who should have been contacted regarding the matter has been contacted and asks whether appropriate action has been taken by the authorities.
- Preventative action – this asks whether or not any action has been taken to prevent the occurrence from happening again.
- Witness details – this part is to be filled out if someone saw the occurrence happen. It is essential if any sort of legal action is to be taken.

Ask



- You could ask the areas covered in form
- You could ask the suggestions for completing appropriate report

Notes for Facilitation

- You could ask the students why reporting and documentation is necessary.
- You could ask from the students about the important things to remember filling reports and documents.
- Assume you got an accident at work place on your knees. File a report and inform the management about the accident.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Make the fire accident report

Skill Practice	Time	Resources
Fire accident report	1 hour	Checklist

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

UNIT 8.2: Documentation of defects

Unit Objectives

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

1. Know about reporting of faulty and damage tools

Say

- Like accident or incident reporting, reporting of faulty and damaged machine, tools and equipments is also necessary.
- Any damaged, faulty or malfunctioning tools, equipment should be immediately withdrawn from use and addressed according to organizational policies and procedures
- You should have to check the following details before doing reporting or providing any repair suggestions:
 - o Last date of inspection
 - o Last date of repair and which part was repaired.
 - o Life cycle of the tool, equipment or machine

Elaborate

In machine or equipment faulty or damage report you have to provide following details:

- Name of the tool or machine
- Registration details of machine
- Who does the inspection of toll and machine before the use
- Trouble or hazard from the defective tool or machine
- Defective part name or number
- Remedial action - Tool or machine has to be discontinue or need repair
- Which process is going to affect due to the faulty machine or tool
- Report whether the machine or tool is performing accurately or precisely.
- Report that there limits, fits and tolerances are set or not according to industrial standards.

Ask



- You could ask the details before doing reporting or providing any repair suggestions
- You could ask the details which are to be required In machine or equipment faulty or damage report

Notes for Facilitation



- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.

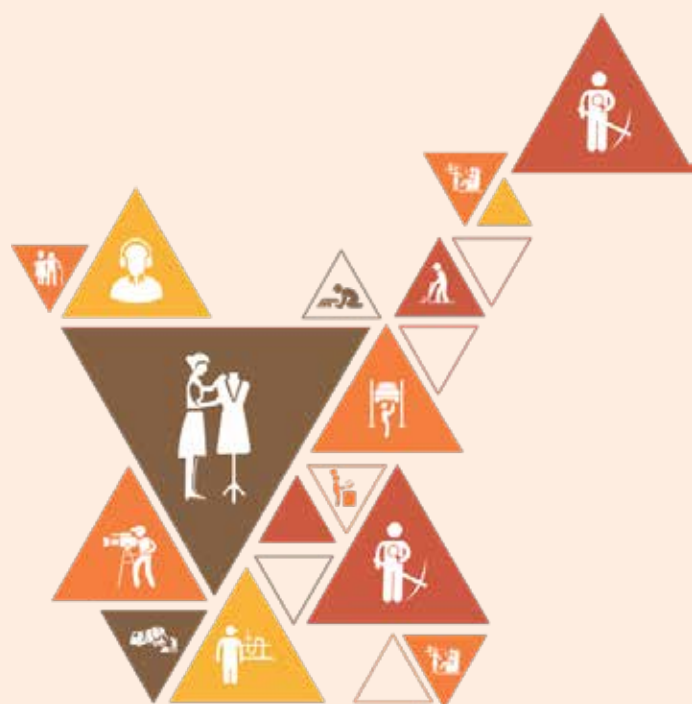
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9. Problem identification and escalation

Unit 9.1 – Risk management

Unit 9.2 – Escalation matrix



ISC/N0008

Key Learning Outcomes

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

1. Know about identification of problem
2. Know about risk management process
3. Know about escalation matrix and problem escalation process

UNIT 9.1: Risk Management

Unit Objectives

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

1. Discuss about risk management process
2. Know about inspecting controlling and controlling the problems

Resources to be used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- Risk Management consists of methodical steps for handling hazards in the workplace.
- One major component of risk management is workplace safety inspections. Inspections are a major tool in ensuring that a workplace remains safe.

Elaborate

One major component of risk management is Workplace Safety Inspections. Inspections are at major tool in ensuring that a workplace remains safe. They help to identify and address new problems or unsafe conditions. Do the inspection according to the inspection checklist made by the organization according to their norms and standards.

After inspection, make an inspection report, which includes the following information:

1. Fill in the name of the area inspected if not already indicated on the sheet, the date and inspectors' names in the area provided. Make sure all pages are attached and kept together with the front page.

2. Check either yes or no according to the situation or item listed, or put a check next to each listed control. If you can't check off the presence of a control, or answer no to any of the questions, this indicates action is needed. To better prioritize action, evaluate the hazard's severity.
3. Record suggested remedial action in the comments for the identified action items. State what needs to be or should be done to correct and better control the hazardous situation.

Demonstrate



- Explain the benefits of workplace inspection.
- Demonstrate the process of risk assessment

Steps – Risk assessment



Risk management is the process of:

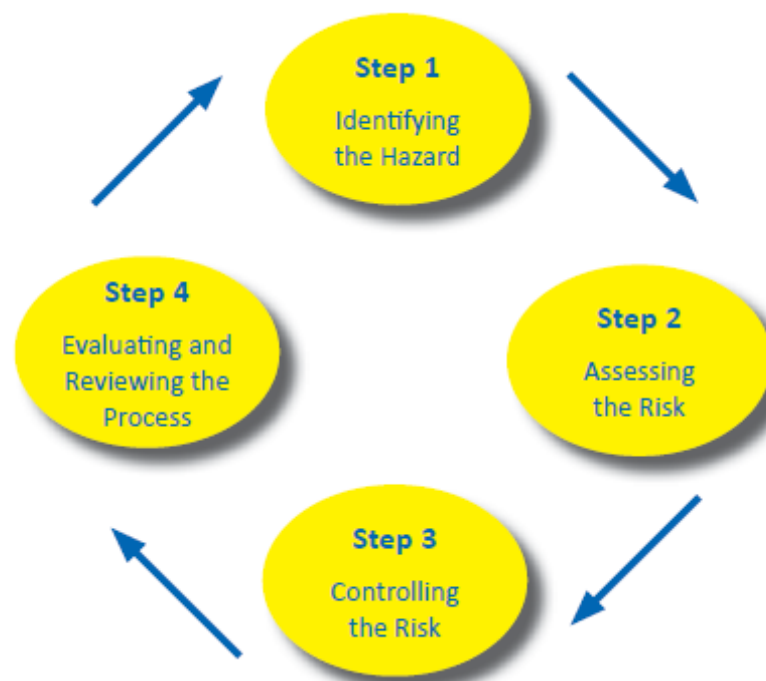


Fig 9.1.1: Risk management process

- Step 1: Identifying** any anticipated problem – Anything that could lead to any harm to any person in the work place, e.g. machine moving, poisonous chemicals, and jobs requiring physical interference.
- Step 2: Evaluating** the issues – Assessing the problem on the basis of their impact, e.g. can it cause a severe injury, sickness or fatality and how likely is this to take place?
- Step 3: Control** the problem or if it's not feasible, controlling the threat arising out of the problem – putting in to practice such strategies that can eradicate or manage the problem, e.g. designing

the equipments differently, putting in machine guards at place, using harmless chemicals, placing heavy objects lifting equipments to reduce manual weight lifting or PPE or inform to supervisor or seniors.

Step 4: Analyzing risk evaluation - to keep a check on control measures and adding better control measures. Also need to discover secure ways of doing things.

Ask



- You could ask how to control the problems
- You could ask from the students risk management process

Notes for Facilitation



- You could ask the students what are the important information make an inspection report

Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Make the checklist of inspection according to norms and standards and Conduct the inspection of workplace

Skill Practice	Time	Resources
Inspection	1 hour	Checklist

Do



- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

UNIT 9.2: Escalation Matrix

Unit Objectives

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

1. Discuss about problem management process
2. Know about escalation matrix

Resources to be Used

- Available objects such as black or white Board, chalk pieces or white board marker pens, duster.
- PC with LCD Projector or Flip Chart
- Participant Manual

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- For escalating issues to the concerned department, every organization follows a specific procedure. This procedure is based on escalation matrix.
- Escalation matrix is a complaint logging system (complaint box) allows you to specify multiple user contacts to be notified in the event of issues.
- By using escalation matrix you can notify the right people at the right time about critical alerts irrespective of the business hours. The escalation matrix is time zone specific and it is available 24X7.

Elaborate

- **Key features of escalation matrix are as follows:**
 - The escalation levels are based on schedules.
 - The service is available 24X7 and schedules are allocated accordingly.

- The schedules are –me zone specific.
- A matrix can be defined at multiple levels ranging from senior management to lower management.

Problem management process

1. Identify problems as described earlier
2. Logging problems – Log the complaint report to the concerned person via email or procedure specified by organization.
3. Categorize problems – categorize the problems into hazards, accidents, faulty tools or equipments and general problems.
4. Prioritization of problem – prioritize the problem according to its impact or severity into high, low, moderate and critical.
5. Initially diagnosis the problem and collect data and information regarding that.
6. Escalate the problem to the management through the escalation procedure.
7. Review the remedial action taken by the management to resolve the situation
8. If found any problem again, then notify the management again about the problem and also suggest the remedial action required for it.
9. Close the complaint after solution of problem.

Demonstrate



- Explain the benefits of workplace inspection.
- Demonstrate the process of risk assessment

Steps - Escalation Matrix



Step 1: Complaint of a given category will by default be assigned and notified by email to the Level 1 department of that category.

Step 2: It defines which an issue has to be raised to whom and within which time frame.

Step 3: If the complaint is not resolved within X number of days (X is the time defined for Level 1 department to resolve the issue), the complaint will be escalated to Level 2 department.

Step 4: If the complaint is not resolved within Y number of days (Y is the time defined for Level 2 department to resolve the issue), the complaint will be escalated to Level 3 department.

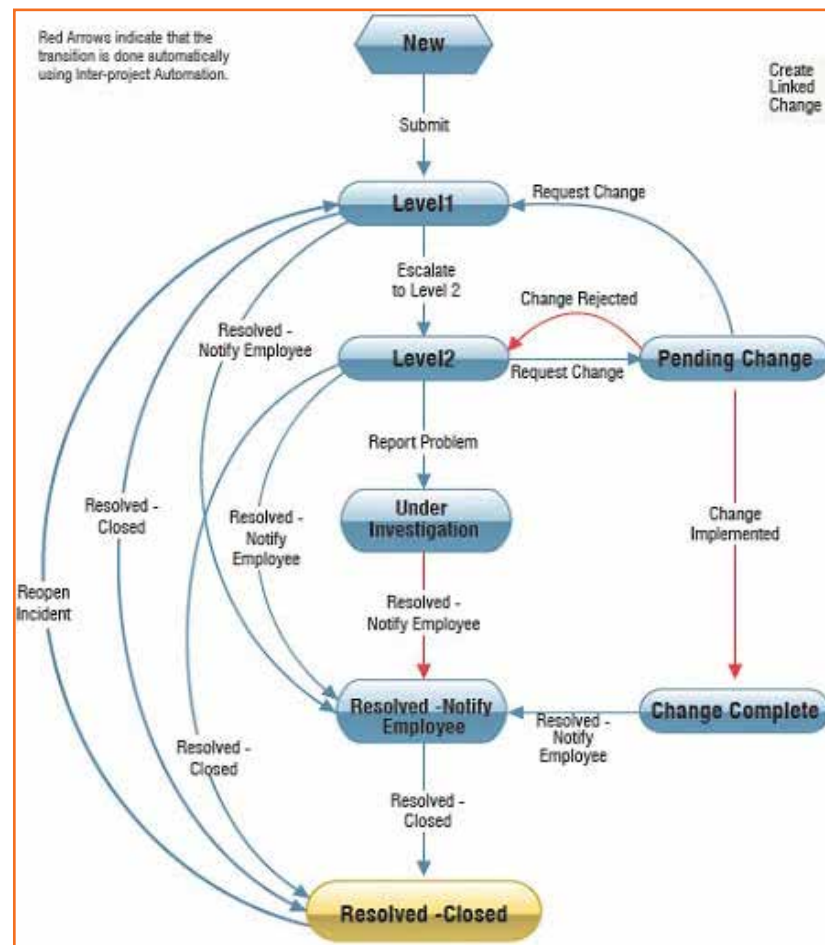


Fig 9.2.1: Escalation matrix

Ask



- You could ask what is escalation matrix and its features
- You could ask the process of problem management
- You could ask how does escalation matrix work for complaints

Notes for Facilitation



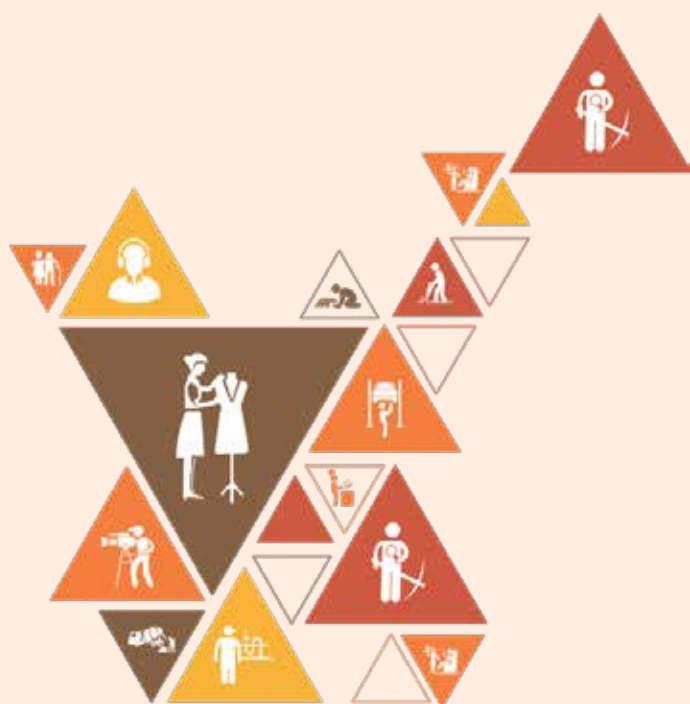
- Summarize the main points.
- Ask participants if they have any doubts.
- Encourage them to ask questions.
- Answer their queries satisfactorily.



10. Work effectively with others

Unit 10.1 – Ensure appropriate communication with others

Unit 10.2 – Workplace etiquettes



ISC/N0009

Key Learning Outcomes

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

1. Know about effective communication with colleagues
2. Know about workplace etiquettes

UNIT 10.1: Ensure appropriate communication with others

Unit Objectives

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

1. Know about how to communicate effectively with colleagues
2. Know about effective communication

Resources to be used

- Available objects such as a duster, pen, notebook etc.

Do

- Welcome and greet the participants. Revise the learnings of the previous sessions and ask them if they have any doubts.

Say

- The success of the organization depends on each colleague.
- For success of organization learn your co-workers' names and learn them quickly because people loves hear their names.
- It doesn't matter a person is more or less significant because of his/her designation. You should respect every employee.

Notes for Facilitation

- You could ask the students what are the ways of effective communication with colleagues

Team Activity



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Skill Practice	Time	Resources
Effective communication between 2 persons	1 hour	Communication tools

Do



- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.

UNIT 10.2: Workplace Etiquettes

Unit Objectives

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

1. Know about organization policies and procedures
2. Know about workplace etiquettes

Say

- Workplace etiquettes are also important aspect of organization policies and procedures.
- Work station should be professional and well-ordered with suitable private touches! It reflects good impression on the team mates.
- Make a Positive impression, cooperate with colleagues and work space savvy are some important tips to help you succeed on the job.
- Work station should be professional and well-ordered with suitable private touches! It reflects good impression on the team mates.

Elaborate

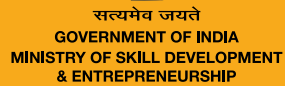
Organization policies and procedures while working with colleagues:

- Never use abusive words with the colleagues
- Follow work etiquettes
- Never share secret or confidential information with your colleagues
- Help your colleague in case of emergency or difficult situations
- Coach your colleagues in case of problems and about organization policies and procedures.
- Communicate with them properly.

Notes for Facilitation

- You could ask the role of colleagues in the success of the organization
- You could ask the students how to make a good impression on the job

[illegible]



11. Employability & Entrepreneurship Skills

Unit 11.1 – Personal Strengths & Value Systems

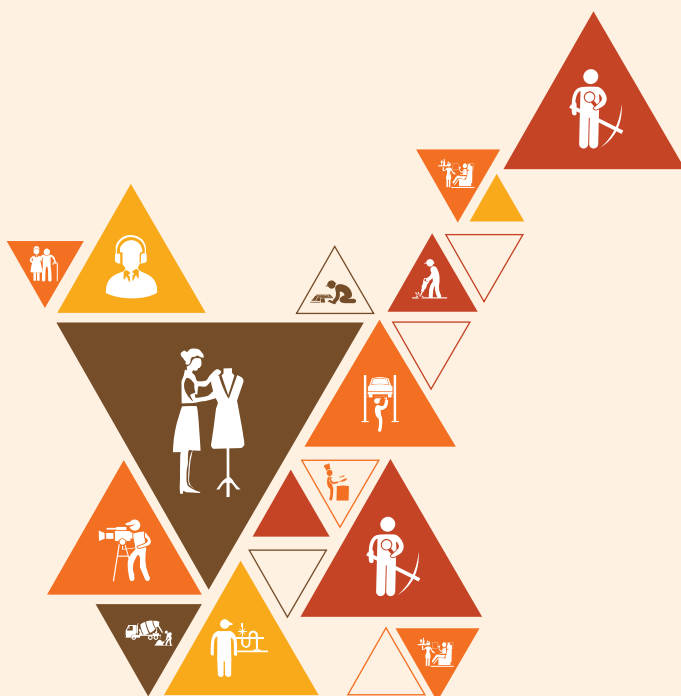
Unit 11.2 – Digital Literacy: A Recap

Unit 11.3 – Money Matters

Unit 11.4 – Preparing for Employment & Self Employment

Unit 11.5 – Understanding Entrepreneurship

Unit 11.6 – Preparing to be an Entrepreneur



Introduction: Employability and Entrepreneurship Skills

This Facilitator's guide includes various activities which will help you as a facilitator to make the sessions participative and interactive.

Ice breaker

- You can begin the module with the following ice breaker:

Five of Anything Ice Breaker Steps:

- Divide the participants into groups of four or five by having them number off. (You do this because people generally begin a meeting by sitting with the people they already know best.)
- Tell the newly formed groups that their assignment is to share their five favourite movies of all time, their five favourite novels or their five least liked films. The topic can be five of anything - most liked or disliked.
- This ice breaker helps the group explore shared interests more broadly and sparks lots of discussion about why each person likes or dislikes their selected five.
- Tell the groups that one person must take notes and be ready to share the highlights of their group discussion with the class upon completion of the assignment.

Expectation Mapping

- During the first session and after ice breaker session, ask the participants to answer the following question: "What do I expect to learn from this training?"
- Have one of the participants write their contributions on a flip chart sheet.
- Write down your own list of covered material in the training on another flip chart sheet.
- Compare the two sheets, commenting on what will and what will not be covered during the training.
- Set some ground rules for the training sessions. Ask the participants to put these rules on a flipchart and display it in the class.
- You may get back to those sheets once again at the end of the last session of the training.
- Benefits of doing this activity:
 - Participants feel better as their opinions are heard.
 - Participants get to know what they should expect from the training.
 - The facilitator gets to know which points to emphasize, which to leave out, and which to add during the training.
- Expectations from the participants:
 - Must sign the attendance sheet when they arrive for class.
 - Conduct themselves in a positive manner
 - Be punctual, attentive, and participative
- Explain the contents that are going to get covered one by one and connect it with the expectation mapping done earlier.
- By the end of this exercise, the participants should have a clear understanding of what to expect from the session and what are the areas that will not get covered.

Defining Objectives

- Defining the objectives in the beginning of the units sets the mood for the unit.
- To begin with the end in mind sets the expectations of the participants as what could be the important takeaways from the session.
- It is also a way of making participants take responsibility of their own learning process.
- For the facilitator, the objectives decide a designed path to progress on so that the learning stays aligned and on track.

5. Read the objectives slowly, one by one, and ask the participants to explain what they think it means.
6. At the end of the session, you could again revisit the objectives to find out from the participants about how many objectives have been achieved.

In order to effectively facilitate this workshop:

1. You must have thorough knowledge of the material in the Participant Handbook, and be prepared to answer questions about it.
2. You may also wish to read other material to enhance your knowledge of the subject.
3. There may be issues raised with which you are not able to deal, either because of lack of time or knowledge. You can either state that you will obtain answers and get back to the participants with the information. In case the query can be turned to an assignment to the class, do so. You can work with the participants on the assignment.
4. You must have a very clear understanding of what the participants want to accomplish by the end of the workshop and the means to guide the participants.
5. As the facilitator, it is your responsibility to make sure that all logistical arrangements are made for the workshop. This may involve doing it yourself or confirming that someone else has made all necessary arrangements associated with the workshop. Assume nothing and check everything before the workshop begins.
6. To break the monotony and boredom during sessions, introduce mini breaks in the form of stretching exercises, jokes, some group songs or games.
7. Invite discussion from the participants.
8. Probe the participants further and lead them to come to affirmative conclusions.
9. Let the participants answer. No answer is incorrect.
10. Ask one participant to write all the points on the whiteboard.
11. Build the sessions from the answers provided by the class.
12. Prepare for the sessions in advance so that the resources like flipcharts, handouts, blank sheets of paper, marker pens, etc. can be kept ready.
13. Ensure that resources like board, markers, duster etc. is available before your session starts.

General instructions for role playing:

1. You are not being asked to be an actor or to entertain. The purpose of the role play is to provide a situation in which you can practice certain 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 require a different approach from that which you might normally use.
3. You (and others) may benefit from the change in approach and behaviour. Therefore, 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 tone 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 reactions in line with the behaviour 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 framework of the role you are taking and try to make your improvisations as realistic as possible.

UNIT 11.1: Personal Strengths & Value Systems

Key Learning Outcomes



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

1. Explain the meaning of health
2. List common health issues
3. Discuss tips to prevent common health issues
4. Explain the meaning of hygiene
5. Discuss the purpose of Swacch 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 motivation with the help of Maslow's Hierarchy of Needs
11. Discuss the meaning of achievement motivation
12. List the characteristics of entrepreneurs with achievement motivation
13. List the different factors that motivate 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 time management
24. List the traits of effective time managers
25. Describe effective time management technique
26. Discuss the importance of anger management
27. Describe anger management strategies
28. Discuss tips for anger management
29. Discuss the causes of stress
30. Discuss the symptoms of stress
31. Discuss tips for stress management

UNIT 11.1.1: Health, Habits, Hygiene: What is Health?

Unit Objectives

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

- Explain the meaning of health
- List common health issues
- Discuss tips to prevent common health issues
- 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.
- Let us do a small activity. I will need some volunteers.

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 measures 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, Doctor).
- Explain the health concerns of the village to the Narrator. The Narrator will brief the class about the skit.
- Give the group of volunteers, 5 minutes to do discuss.
- At the end of 5 minutes, ask the group to present the skit to the class assuming them as the villagers.
- The class can ask questions to the group as a common villager.

Summarize

- Through this activity we got some tips on how can we prevent these common health issues.

Say 

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

Activity 

- Health Standard Checklist from the Participant Handbook.

Ask 

- How many of you think that you are healthy? How many of you follow healthy 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 through the health standards given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test 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 ticks have they got.

Summarize 

- Tell them that they need to follow all the tips given in this checklist regularly in order to remain healthy and fit.

Ask **Discuss:**

- Is it necessary to practice personal hygiene every day? Why?
- How does a person feel when they do not practice good personal hygiene? Why?
- Can good personal hygiene help a person feel good about his/her self? How?

Say 

- Discuss the meaning of hygiene as given in the Participant Handbook.

Activity 

- Health Standard Checklist: Hygiene

Say 

- Let's do an exercise to find out if we maintain good hygiene habits or not.
- Open the Participant Handbook and read through the Health Standard checklist given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test 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 ticks have they got.
- Ask them to calculate their score.
- Tell them what each score indicates by reading aloud what has been mentioned in the Participant Handbook.

Ask 

- How many of you have heard about “Swachh Bharat Abhiyan”?
- Can you tell the class what it is about?

Summarize 

- Tell them about Swachh Bharat Abhiyan as given in the Participant Handbook and request them to take a pledge to keep our country clean.

Ask 

- What is a habit?

Say 

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

Summarize 

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

UNIT 11.1.2: 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 equipments
- 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:
 - Spills on floors or tripping hazards, such as blocked aisles or cords running across the floor.
 - Working from heights, including ladders, scaffolds, roofs, or any raised work area.
 - Unguarded machinery and moving machinery parts; guards removed or moving parts that a worker can accidentally touch.
 - Electrical hazards like cords, missing ground pins, improper wiring.
 - 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 work place.
- Second part will cover a few safety signs, symbols and equipments at work place.
- Use this format for the first part of the activity.

PART 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 corrective action.

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 equipments.
- 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 cull out the information from each group.
- Keep a check on time.
- Tell the group to wind up the discussion quickly if they go beyond the given time limit.

Ask **De-briefing**

- What did you learn from the exercise?
- As an entrepreneur, 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 tips to design a safe workplace and non-negotiable employee safety habits.

UNIT 11.1.3: Self Analysis- Attitude, Achievement Motivation: What is Self Analysis?

Unit Objectives

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

- Explain the importance of self- analysis
- Discuss motivation with the help of Maslow's Hierarchy of Needs
- Discuss the meaning of achievement motivation
- List the characteristics of entrepreneurs with achievement motivation
- 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.

Say

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

Team Activity

Tower building

- Each group which will create tower using the old newspapers.

Do 

- Divide the class into groups.
- Give them some old newspapers.
- 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 to 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 entrepreneurs with achievement motivation 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 tide came hundreds of starfish and when the tide receded, they were left behind and with the morning sun rays, they would die. The tide was fresh and the starfish were alive. The 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 does not matter. If everyone made a small difference, we'd end up with a big difference, wouldn't we?

Ask 

- What did you learn from this story?

Activity **What Motivates You?**

- This is an individual activity.
- It is an exercise given in the Participant Handbook.

Do 

- Ask the class to open their Participant Handbook and complete the exercise given in the section What Motivates 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 about what motivates you and your positive attitude can help in your business as well in life.

UNIT 11.1.4: Honesty & Work Ethics

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

- Talk about honesty, qualities of an honest person, and the importance of honesty in entrepreneurs as 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 focussed around the following:
 - What went wrong?
 - Who was at fault?
 - Whom did it impact- the customer or the businessman?
 - How would it impact the business immediately? What would be the long term impact?
 - What could be done?
 - 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.
- Put down the de-brief questions on the board and ask the groups to focus their discussion around these questions.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem. 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. The presentation can be a narration or a role play.
- 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

Aakash has a small mobile retail sales and repair shop in Allahabad. He has one of the most popular outlets and has great rapport with his customers.

It's around 11 AM when a customer barges in to the shop and starts shouting at Aakash for giving her a faulty instrument. The screen of her mobile is cracked from one side. Aakash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue him and to go to Consumer Court for cheating her. Now, the problem occurred somewhere outside the shop but as other customers were listening to the conversation, it might impact his business. The situation needs to be managed very sensitively. What would you do if you were in Aakash's place?

Scenario 2

Rajni does beautiful Phulkari embroidery on suits and sarees. She has a small home-based business. She has a huge list of customers on Facebook and WhatsApp who give her orders regularly. Smita is one of her old and regular customers. As her sister-in-law's wedding was around the corner, Smita wanted to buy few handcrafted Phulkari duppatta. She placed an order for three duppattas via WhatsApp and requested Rajni to send them as soon as possible. When the parcel reached Smita through courier she found that out of the three duppattas, only one was hand embroidered and the other two had machine embroidery on them. Even the length and the quality of the material was not as desired. Smita was heartbroken. It was a complete waste of money and moreover she couldn't wear what she had planned to during the wedding functions. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment.

Smita has also sent a feedback and expressed her disappointment on the social media... this will directly affect Rajni's business. What would you do if you were in Rajni's place?

Scenario 3

Shankar is a tattoo artist who has a small tattoo showroom in a big, reputed mall in New Delhi. Mr Saksham had an appointment for today, at 11:00 am but he reached at 11:50 am. Meanwhile, Shankar had to reschedule his next appointment. After availing Shankar's services, Mr Saksham started yelling in an abusive language, refusing to pay the requisite amount, and finding faults in the services provided by him. Who was at fault in this case? What should Shankar do? Should he confront Saksham or give in to the demands of the client?

Scenario 4

Shailender is an online cloth reseller who does business through social networking sites such as Facebook and WhatsApp. Priyanka made online payment for a dress to Shailender. But she did not receive the dress for a month. When she asked for a cancellation, Shailender started misleading her. For almost 45 days, he kept promising her that he will pay the amount today, tomorrow, day after etc. Even after repeated calls and messages when she did not receive the payment or the dress, she decided to write a post against him on a popular social media platform. As a result, Shailender lost lots of customers and his flourishing business faced a major crisis. How could this situation have been managed?

Say

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Once the presentation is over, the class can ask their questions.

Do 

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

Summarize 

- Ask the participants what they have learnt from the 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 honesty and work ethics for entrepreneurs.

UNIT 11.1.5: Creativity and Innovation

Unit Objectives

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

- List the characteristics of highly creative people
- List the characteristics of highly innovative people

Resources to be Used

- Participant Handbook
- Chart papers
- Marker pens

Ask

- You must be aware of the term 'Rags to riches' and heard stories related to the term.
- What do these stories tell us?
- What was so special about these people?

Say

- Let's have a look at these stories.
- There are some inspiring stories about people which I would like to share with you.
- Narrate these stories to the class.

A.P.J. Abdul Kalam

Who has not heard of A.P.J. Abdul Kalam: Avul Pakir Jainulabdeen Abdul Kalam hailed from a very humble background. His father was a boat owner. To help his family, Kalam would work as a newspaper vendor. With limited resources, he graduated in Physics and studied aerospace engineering. He was instrumental in India's step towards nuclear energy. In 2002, he became the 11th President of India.

Water filter/purifier at source

Two young boys studying in classes 4 and 5, from Lingzya Junior High School, Sikkim designed a simple innovative low cost water purifier.

Inspiration behind the idea: Most people today prefer to use a water filter/purifier at their home.

Both the children have given idea to have filter/purifier at the source of water so that everyone has access to clean water without having to make an investment in purchasing a filter/purifier.

Soring's idea is to have a centralised purification system at the point of distribution like water tank while Subash's idea is to have such purifiers attached to public taps.

Source: <http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm>

Solar seeder

This is a story of a innovative solar seeder and developed by Subash Chandra Bose, a class 8, student from St Sebasthiyar Matriculation School, Pudukkottai, Tamil Nadu. Subash has developed a solar powered seed drill, which can undertake plantation for different size of seeds at variable depth and space between two seeds.

Source: <http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm>

Looms for physically challenged

Now this is really inspiring of two sisters, Elakkiya a Class 6 student and Pavithra a Class 9 student of SRC Memorial Matriculation, Erode, Tamil Nadu.

The two sisters have come up with loom for lower limbed physically challenged. In their loom they have replaced the pedal operated system with a motor and a gearbox attached to a pulley mechanism.

Source: <http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm>

Ask 

- If they can, why can't you?
- Discuss concepts related to 'Creativity and Innovation' with the participants as given in the Participant Handbook.

Say 

- Recall the stories on motivation.
- What is the inner drive that motivates people to succeed?
- Let's learn more about such creative and innovative entrepreneurs with the help of an activity.

Team Activity 

- This is a group activity.

- Think of any one famous entrepreneur and write a few lines about him or her.

Activity De-brief

- Why did you choose this particular entrepreneur?
- What is his/her brand name?
- What creativity does he/she possess?
- What was innovative about their ideas?

Do 

- 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 time. 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 the de-brief questions.

Summarize

- 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.

Notes for Facilitation

- Source for stories on innovations:

<http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm>

UNIT 11.1.6: Time Management

Unit Objectives

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

- Discuss the benefits of time management
- List the traits of effective time managers
- Describe effective time management techniques

Resources to be Used

- Participant Handbook

Ask

Does this sound like you?

- I can never get enough time to finish what I am doing in a day.
- I have so many things to do that I get confused.
- I want to go for a walk and exercise, but I just do not have the time.
- I had so much to do, so I could not deliver that order on time.
- I would love to start my dream business; but, I just do not have the time.

Example

- Let's look at these two examples:

Example 1:

Ankita works from home as a freelance writer. She says she can easily put in 8 hours of dedicated work in a day. Because she works from home, she saves money on travel and has a comfortable work routine. But there is a challenge and it is distraction. As she works from home, she can easily just get up and sit down on the sofa to watch TV, wasting valuable time. She may have chores to do, errands to run and bills to pay. She ends up working only two to three hours a day and the result is, her work gets piled up. She is unable to take on more work due to this. Even though her quality of work is appreciated her clients are not very happy about the delay in submission.

Example 2:

Javed has started a successful online selling company from home and makes a good living from his sales. He has set up a small office space in his living room. As both his parents are working full-time, he also has the role of taking care of his two younger siblings. He almost spends half of his day with the younger kids. He does not mind it but it means taking time away from the work. He is still able to manage his online business with these commitments. He wants to spend some more dedicated hours so as to increase his profits. He also wants to look into new business avenues. What should he be doing.

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 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 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 effective time management with the help of an activity.

Activity

Effective Time Management

- 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 action 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.

PART 2

URGENT-IMPORTANT GRID

- You have to make a grid 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 to think about each activity that 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 busywork.
- 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.

TO- DO list format

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

URGENT-IMPORTANT GRID

URGENT/ IMPORTANT

- Meetings
- Last minute demands
- Project deadlines
- Crisis

NOT URGENT/ IMPORTANT

- Planning
- Working towards goals
- Building relationship
- Personal commitments

1**2****3****4**

- Interruptions
- Phone calls/ E-mails
- Other people's minor demands

URGENT/ NOT IMPORTANT

- Internet surfing
- Social media
- Watching TV

NOT URGENT/ NOT IMPORTANT

URGENT/ IMPORTANT GRID format

URGENT/ IMPORTANT**NOT URGENT/ IMPORTANT****1****2****3****4****URGENT/ NOT IMPORTANT****NOT URGENT/ NOT IMPORTANT**

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 in to-do list 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 time. Tell the group to wind up quickly if they go beyond the given time limit.

Say

Activity De-brief:

How can we balance tasks between the four categories?

How to manage time through this grid?

- **Category 1: Urgent/Important**
 - 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 time to work on longer-term plans.
- **Category 2: Not Urgent/Important**
 - 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**
 - 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: Not 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 time managers and effective time management techniques as given in the Participant Handbook.

Summarize

- Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

Notes for Facilitation

- Here is a short story. You can conclude the session narrating the story. To make it more interesting you can perform the demonstration described and discuss the short story.
 - ♦ One day an expert in time 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; time 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 time you need to spend on the big, important stuff (the big rocks).
- End the story with these lines...
 So, tonight, or in the morning tomorrow, 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

UNIT 11.1.7: Anger Management

Unit Objectives

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

- Discuss the importance of anger management
- Describe anger management strategies
- Discuss tips for anger management

Resources to be Used

- Participant Handbook

Ask

- What is anger? Is anger good or bad?
- Is anger normal or an abnormal behaviour? How can anger harm you?
- Why is it important for entrepreneurs to manage their anger?

Say

- Talk about anger and the importance of anger management in entrepreneurs as discussed in the Participant Handbook.
- Let us do a small activity. This is an individual activity.
- Think of the incidents and situations that angered 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.

Activity

- Do you remember any incident which has hurt
 - ♦ you physically
 - ♦ you mentally
 - ♦ your career
 - ♦ your relationships.

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

List of triggers that make you angry:

Someone says you did something wrong.

You want something you can't have now.

You get caught 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.

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:

Anger Management Techniques

Say

- 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.

Do

- 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.

Ask

De-brief 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 tips 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 Facilitation

- 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 11.1.8: Stress Management: What is stress?

Unit Objectives

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

- Discuss the causes of stress
- Discuss the symptoms of stress
- Discuss tips for stress management

Resources to be Used

- Participant Handbook

Ask

- You are waiting in the reception for an interview or a very important meeting, suddenly your legs are shaky, your hands are cold, you are feeling nervous. Have you ever been in this kind of situation?
- Have you had days when you had trouble sleeping?
- Have you ever been so worried about something that you ended up with a terrible headache?

Say

- You've probably heard people say, "I'm really stressed out" or "This is making me totally stressed."

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 entrepreneurs 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.

Do

- 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:

- What was/ were the cause(s) of stress?
- Was the stress avoidable or manageable under the given circumstances?
- If yes, how do you think that the stress could be avoided (managed)?
- If no, then why not?
- 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 getting 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 attend the call or finish the reports on time.

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 contemplating 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. Rahul has promised to buy her the dress for her birthday.

Rahul is stressed, does not understand what to do. He is unable to concentrate on his work and unable to complete the tasks assigned. His team leader has already warned him of the delay.

Scenario 3

Sheela calls the cable company as she has unknown charges on her bill. She has to go through the automated voice mail menu three times and still can't get through to a customer care executive. After 15 minutes of repeated efforts, her call is answered. She explains the entire issue to the customer care executive but before the person could suggest a way out, the call drops.

Now Sheela has to call back and repeat the whole process all over again with a new customer care executive. She is very angry and calls again but cannot connect this time.

She has to leave to office so she decides to call from office and check. When she connects this time she is angry and argues with the executive on the call. All her co-workers around are looking at her as her volume has suddenly increased. She bangs the phone and ends the call.

Her co-worker Neelam enquires what has happened to her. She ignores her and just walks off. She has become irritable and her behaviour and tone with other co-workers is not acceptable.

Scenario 4

Arpit is a young entrepreneur who started doing business through Facebook few weeks back. He had always been into a job. Although Arpit has very few financial liabilities, it wasn't an easy decision to leave a comfortable job at once and look for newer pastures. Arpit's boss warned him of the consequences and the challenges of starting a business when nobody ever in his family had been in business.

He has not been able to get a good deal till now. This is an important life shift for him which comes with unknown variables. Arpit is nervous and 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.

Ask **De-brief questions:**

- What was/ were the cause(s) of stress?
- Was the stress avoidable or manageable under the given circumstances?
- If yes, how do you think that the stress could be avoided (managed)?
- If no, then why not?

Say 

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Post presentation, the other groups may ask questions to the group that has presented.

Do 

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief 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.

Say 

- 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.

De-brief:**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 alternate ways to get up on time, finished prior tasks on time and planned for client meetings in advance 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

Sometimes, 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.

Scenario 4

A positive, major life change can be a source of good stress. Regardless of how good the change is, it can be stressful. Stress caused by a positive and major life change can be beneficial because it causes a person to step out of their comfort zone and learn new skills. Here, Arpit may become a successful entrepreneur or learn new ways to do things differently.

Now let us see this scenario, can I have a volunteer to read out this case to the class.

Do 

- Ask one of the participant who can volunteer and read out this scenario to the class.

Scenario 5

Rakesh lives in Kathmandu with his wife and two beautiful daughters Sarah and Sanya. Nepal was hit by a massive earthquake and Rakesh's building collapsed during the earthquake. During evacuation, Rakesh realised that though his wife and Sarah were fine and suffered only minor bruises, Sanya was nowhere in the scene. Panic stricken, he started calling her name and searching her frantically. A little later, he heard a meek voice from beneath the debris. He quickly removed the rubble to find a huge bed. Rakesh was pretty sure that Sanya was trapped underneath. Though he was badly bruised, he gathered all his courage and with all his might, he lifted the several-ton bed to save Sanya's life. Everyone was relieved to see Sanya alive and also extremely surprised to see this father's ability to access superhuman strength.

- Ask the audience to applaud for the participant after the scenario is read completely.
- Discuss the scenario, ask de-brief questions:
 - What kind of stress was Rakesh undergoing in this case?
 - Was the stress avoidable or manageable under the given circumstances?
 - What was the result of the stress?

Say **De-brief:**

- Not all stress is harmful; good stress is actually energizing. This was a case of lifesaving stress, or hero stress, which is an important example of good stress. You may have heard stories in which a person performs an impossible feat of physical strength in order to save their life or the life of someone they love. This type of stress causing a surge of adrenaline is good for us.

Summarize

- Close the discussion by summarizing the tips to manage stress 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.

Notes for Facilitation

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

[illegible]



UNIT 11.2: 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 11.2.1: Computer and Internet Basics: Basic Parts of a Computer

Unit 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 as 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.
- Close the discussion by summarizing the importance of computer and internet for entrepreneurs.

Practical

- Conduct a practical session.
- Ask the participants to assemble in the computer lab.
- Give some hands on practice exercises.

Do

- 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 11.2.2: MS Office and Email: About MS Office

Unit Objectives

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 MS Office

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 application, benefits and working.
- **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.
- **Microsoft Excel** is a tool for accounting and managing large sets of data. It can also simplify analysing data. It is also used to create charts based from 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 you 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?

Say

- 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 

- Demonstrate how to create email id.
- Demonstrate how to write new mails, send mails.
- Demonstrate how to use MS Office application to create a letter and send it as attachment in an email.
- Demonstrate how to use other MS Office applications.

Practical 

- 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 any questions related to what they have talked about so far.

UNIT 11.2.3: E-Commerce

Unit Objectives

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 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 System 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 transaction through payment gateways.
- Conclude the discussion by mentioning how important e-commerce has become in our day to day transactions.

Say 

- E-commerce activities can be classified based on the types of participants in the transaction.
- Discuss “Types of E-commerce” from the Participant Handbook.

Do 

- 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.

Say 

- E-commerce activities bring a host of benefits for both, retailers and customers.
- Discuss benefits of E-commerce from the Participant Handbook.

Explain 

- The majority of the population that uses E-commerce activities lives in tier-1 and tier-2 cities. To encourage the use of digital money in tier-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.

Say 

- 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 E-commerce the shop is the website where your products are displayed. If it is your own website it will exclusively showcase 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 time 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 

- Demonetization 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, state bank 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 Paytm and state bank buddy.

Ask 

- Why do you think people have started using digital money instead of hard cash? Is demonetization the only reason?

Say 

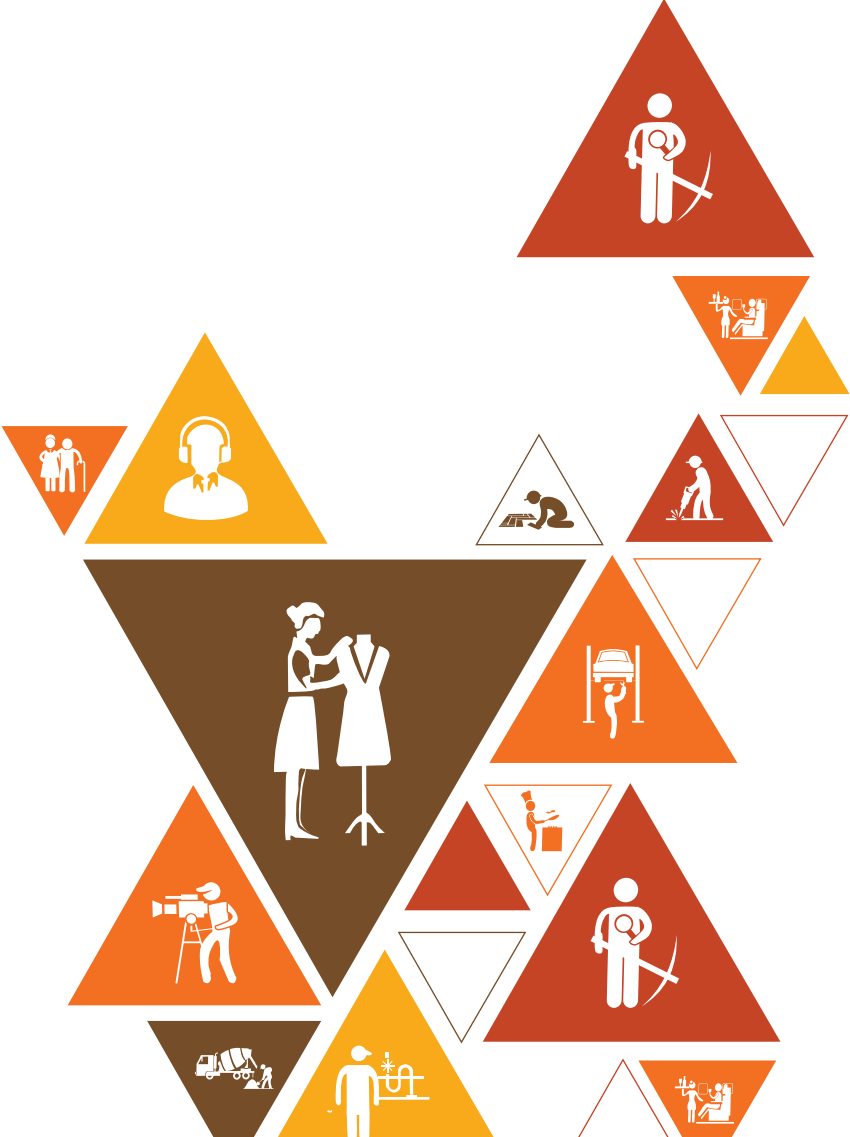
- Digital money gives a lot of advantages over the conventional hard cash. Some of them are:
 - ♦ Digital payments are easy and convenient. You do not need to take loads of cash with you, a mobile phone or a card will suffice.
 - ♦ With digital payment modes, you can pay from anywhere anytime.
 - ♦ Digital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

Notes

[illegible]



UNIT 11.3: Money Matters

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 11.3.1: Personal Finance – Why 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 month. She always saves 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 40,000.

Suhani says tells her family not to worry and that she has about 50,000, which she has 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?

Say

- 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.

Ask

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

Say

- 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 instalment 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 upset.

Ask

- 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 effective manner?
- Do you want to learn how to save money and use it effectively?

Say

- Let's learn personal saving with the help of a group activity.

Team Activity

Personal Finance- Why to save

- This activity has two parts:

PART 1

WAYS TO SAVE MONEY

- You are earning 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 10,000/- 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 De-brief

- 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.
- Ways to save money.
- How the money saved can be used for different purposes.

UNIT 11.3.2: Types of Bank Accounts, Opening a Bank Account

Unit Objectives

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 class mate 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.

Ask

- Do you try to save money monthly but have to spend it on unforeseen expenditure?
- Have you ever thought of depositing your savings in a bank?

Say

- 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 someone say what are the different types of bank accounts?

Say

- Let's learn about the different types of bank 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 De-brief

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

Say

- 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?

Say

- Mention officially valid KYC documents (refer to the Participant Handbook)
- Now, let's understand the procedure of opening a bank account through an activity.

Team Activity

Opening a Bank Account

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

PART 1

FILLING A BANK ACCOUNT OPENING FORM

- You have to fill a bank 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 needs for filling the form.
- Now fill in the form.

Activity De-brief

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 time.
- Tell the group to wind up quickly if they go beyond the given time limit.

Summarize **Note:**

- You can summarize 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.

Sample Bank Account Opening form.

XXX Bank

Photograph

SAVING BANK ACCOUNT OPENING FORM

Account No.: _____ Date: _____

Name of the Branch			
Village/Town			
Sub District / Block Name			
District			
State			
SSA Code / Ward No.			
Village Code / Town Code		Name of Village / Town	

Applicant Details:

Full Name	Mr./Mrs./Ms.	First	Middle	Last Name
Marital Status				
Name of Spouse/Father				
Name of Mother				
Address				
Pin Code				
Tel No. Mobile		Date of Birth		
Aadhaar No.		Pan No.		
MNREGA Job Card No.				
Occupation/Profession				
Annual Income				
No. of Dependents				

Detail of Assets	Owning House : Y/N	Owning Farm : Y/N															
	No. of Animals :	Any other :															
Existing Bank A/c. of family members / household	Y / N If yes, No. of A/cs. _____																
Kisan Credit Card	Whether Eligible Y / N																
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.																	
<p>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.</p>																	
<p>Place: _____</p> <p>Date: _____ Signature / LTI of Applicant _____</p>																	
<p>Nomination:</p> <table border="1"> <tr> <th colspan="5">I want to nominate as under</th> </tr> <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> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>			I want to nominate as under					Name of Nominee	Relationship	Age	Date of Birth in case of minor	Person authorised in case to receive the amount of deposit on behalf of the nominee in the event of my /minor(s) death.					
I want to nominate as under																	
Name of Nominee	Relationship	Age	Date of Birth in case of minor	Person authorised in case to receive the amount of deposit on behalf of the nominee in the event of my /minor(s) death.													
<p>Place: _____</p> <p>Date: _____ Signature / LTI of Applicant _____</p> <p>Witness(es)*</p> <p>1. _____</p> <p>2. _____</p> <p>*Witness is required only for thumb impression and not for signature</p>																	

UNIT 11.3.3: Costs: Fixed vs. Variables: What are Fixed and Variable Costs?

Unit Objectives

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

- Differentiate 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 cost with examples. Let us do a small activity.

Team Activity

Identify the type of cost

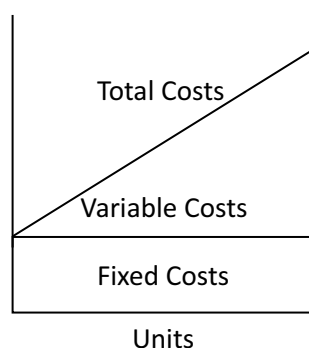
1. Rent
2. Telephone bill
3. Electricity bill
4. Machinery
5. Insurance
6. Office supplies/ Raw materials
7. Employee salaries
8. Commission percentage given to sales person for every unit sold
9. Credit card fees
10. Vendor bills

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 identify 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.



- Let's learn the difference between fixed and variable cost with the help of an activity.

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 cost or requirements for your business.
- How will you differentiate between the fixed and variable cost.

Activity De-brief

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

Summarize

- 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 Facilitation

- Answers for the activity - Identify the type of cost

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 11.3.4: Investments, Insurance and Taxes

Unit Objectives

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

- Describe the main types of investment options
- Describe the different types of insurance products
- Describe the different types of taxes

Resources to be Used

- Participant Handbook

Ask

- Ask the participants- “What do you see first thing in when you get your mobile bill? Apart from the amount and due date do you have a look at the taxes you are being billed for?”
- Why do you think people get their cars insured or have a medical insurance?
- You have saved money and want to invest it, how would you decide what is the best investment for your money?

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 re-invest the money otherwise he will have to pay capital tax. What is capital tax and how is it different from income tax?

Jasmeet and Anup are 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 income 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.

Say

- Discuss the Investment, Insurance and Taxes as given in the Participant Handbook.

Ask

- How do investments, insurances and taxes differ from each other?

Say

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

Say

- We will have a quiz today.

Team Activity

- The activity is a quiz.

Do

- 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 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

- Summarize the unit by discussing the key points and answering question

Notes for Facilitation

Questions for the quiz

1. What are bonds?
Bonds are instruments used by public and private companies to raise large sums of money.
2. Who issues the bonds?
Private and public companies issue the bonds.
3. Why are bonds issued?
To raise large amount of money as it cannot be borrowed from the bank.
4. Who is the buyer of stocks and equities?
The general public is the buyer.
5. What types of scheme is the Sukanya Samriddhi Scheme?
Small Saving Scheme
6. What is the difference between mutual and hedge funds?
Mutual funds are professionally managed financial instruments that invest the money in different securities on behalf of investors. Hedge funds invest in both financial derivatives and/or publicly traded securities.
7. Why is a loan taken from the bank to purchase real estate?
To lease or sell to make profit on appreciated property price.
8. Name the two types of insurances?
Life Insurance and Non-life or general insurance
9. Which insurance product offers financial protection for 15-20 years?
Term Insurance
10. What is the benefit of taking an endowment policy?
It offers the dual benefit of investment and insurance.
11. Mr. Das gets monthly return on one of his insurance policies. Name the policy?
Money Back Life Insurance

12. What are the two benefits of a Whole Life Insurance?

It offers the dual benefit of investment and insurance

13. Which policy covers loss or damage of goods during transit?

Marine Insurance

14. After what duration is the income tax levied?

One financial year

15. What is long term capital gain tax?

It is the tax payable for investments held for more than 36 months.

16. Name the tax that is added while buying shares?

Securities Transaction Tax

17. What is the source of corporate tax?

The revenue earned by a company.

18. Name the tax whose amount is decided by the state?

VAT or Value Added Tax

19. You have bought a T.V. What tax will you pay?

Sales Tax

20. What is the difference between custom duty and OCTROI?

Custom duty is the charges payable when importing or purchasing goods from another country. OCTROI is levied on goods that cross borders within India.

UNIT 11.3.5: Online Banking, NEFT, RTGS, etc.

Unit Objectives

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 bill 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. the computer system.
- Tell the class the various features of online banking:
 - Through their website set-up your online account.
 - 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.
- Discuss about maintaining the security of the online account.

Say

- One of the biggest advantage 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 time and effort involved in physically transferring a sum of money.
- Discuss “Electronic Funds Transfer” from the Participant Handbook.

Do

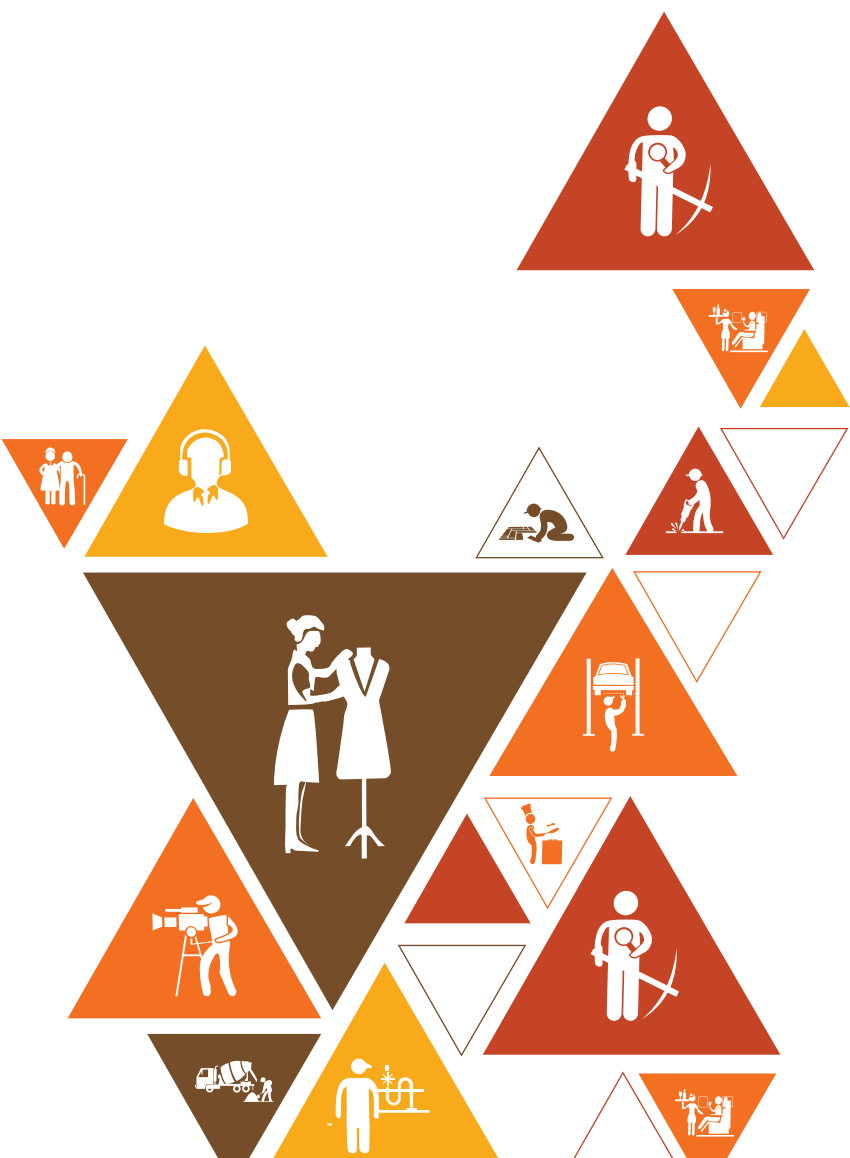
- Discuss how to transfer money from one account to another using online banking (NEFT/RTGS, etc.).
- Illustrate with an example.

Summarize

- Close the discussion by summarizing the about online banking.
- Ask the participants if they have any questions related to what they have talked about so far.

Notes

[illegible]



UNIT 11.4: Preparing for Employment & Self Employment

Key Learning Outcomes

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

1. Discuss the steps to follow to prepare for an interview
2. Discuss the steps to create an effective Resume
3. Discuss the most frequently asked interview questions
4. Discuss how to answer the most frequently asked interview questions
5. Identify basic workplace terminology

UNIT 11.4.1: Interview Preparation: How to Prepare for an Interview?

Unit Objectives

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

- Discuss the steps to follow to prepare for 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.
- Let's do an activity to understand how to prepare for interviews better.

Activity 1

- Introducing Yourself

Do

- 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 participant what they gathered about the participant who was providing information.
- Now repeat the exercise with five other participants.

Ask

- 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 de-brief questions to cull out the information from each group.
- Keep a check on time.

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?

Summarize

- 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:
 - Tell the participants to create a positive and good impression in an interview. It is important for them to prepare for an interview beforehand.
 - 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.
 - 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.
 - The participants will get only one chance to create a good first impression.

UNIT 11.4.2: Preparing an Effective Resume: How to Create an Effective Resume?

Unit Objectives

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/attractive resumes discussed in the Participant Handbook.
- Now let's prepare a resume to understand the process in a better way.

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 attractive 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.

Say

- Do you think the candidate should apply for the job posting described in the advertisement?
- We have already discussed the steps involved in creating an effective/attractive resumes.
- Now let's prepare a resume for the candidate details given in the activity.

Activity

Case Study Analysis

- In the first section of the activity, you are being given the information about a candidate who is applying for a particular job.
- In the second section, you are being given the detailed description of the job posting. Create a resume for the candidate to apply for the job posting.
- Use the information that has been provided about the candidate to create this resume.

Candidate Details

Nipesh Singla was born on 20th April, 1988 in Chandigarh, India. He currently resides at 1XX7, Sector XX D, Chandigarh –160018. His mobile number is 988XXXXX01, and e-mail address is nxxxxxxxla@gmail.com. Nipesh attended middle and senior school at Government Boys Senior Secondary School, Sector 15, Chandigarh. He has been a very talented boy since school. He was fond of painting and watching old Hindi movies. As part of a school charity program, he volunteered at the children's hospital during his senior years.

In July 2007, he joined Westwood School of Hotel Management, Zirakpur to pursue a diploma course in Hotel Management and Catering. After completing this course, he joined XYZ Group of Hotels as a Housekeeping intern in June 2010 for six months. In this role, he was responsible for cleanliness and maintenance of one floor in the hotel. Taking advantage of his strong interpersonal skills, he also got opportunities to make housekeeping arrangements for corporate meetings. While pursuing education, he gained working knowledge of Microsoft Word, Excel, Access and PowerPoint.

Nipesh is detail-oriented, flexible and adaptable. He has successfully worked with a diverse work force. He gelled well with his peers, both in college and during his internship. After completing the internship, his objective has been to find a job opportunity where he can use his skills and experience. Backed by experience, he is confident about his skills as housekeeping assistant.

Job Posting

* Do you see yourself as a HOUSEKEEPING SUPERVISOR?

What's your passion? Whether you're into cricket, reading or hiking, at IHG we are interested in YOU. At IHG, we employ people who apply the same amount of care and passion to their jobs as they do in their hobbies - people who put our guests at the heart of everything they do. And we're looking for more people like this to join our friendly and professional team.

THE LOCATION:

At the moment, we are looking for HOUSEKEEPING SUPERVISOR to join our youthful and dynamic team at Holiday Inn Amritsar, Ranjit Avenue in Amritsar, Punjab (India). Holiday Inn Amritsar is ideally located in Amritsar's commercial district on Ranjit Avenue with the world famous Golden Temple located only a short distance away. Sparkling chandeliers mark an incomparable arrival experience as you escape to the welcoming environment that is, Holiday Inn Amritsar. The fresh international brand to celebrate and explore Amritsar.

Salary: Negotiable

Industry: Travel / Hotels / Restaurants / Airlines / Railways

Functional Area: Hotels, Restaurants

Role Category: Housekeeping

Role: Housekeeping Executive/Assistant.

Desired Candidate Profile

Friendly, pleasant personality, Service - oriented.

You should ideally be Graduate/ Diploma holder in HM and at least 2 years of experience as a supervisor in good brand with good communication skills, English is a must.

In return we'll give you a competitive financial and benefits package. Hotel discounts worldwide are available as well as access to wide variety of discount schemes and the chance to work with a great team of people. Most importantly, we'll give you the room to be yourself.

*Please get in touch and tell us how you could bring your individual skills to IHG.

Education-

UG: Any Graduate/ Diploma holder

PG: Post Graduation Not Required

Say

- Now, let's share the resume with the fellow participant sitting next to you and evaluate each other's effort.

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 Facilitation

- 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:

Nipesh Singla

#1XX7, Sector XX-D

Chandigarh-160018

Mobile No: 91-988XXXXX01

E-mail: nxxxxxxxxla@gmail.com

Objective: Seeking an opportunity to use my interpersonal skills and experience to contribute to your company's growth, profitability 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 multi-cultural environment

- Detail oriented, flexible, and adaptable
- Knowledge of Microsoft Word, Excel, Access and PowerPoint

Educational background:

- Diploma in Hotel Management and Catering, Westwood School of Hotel Management, Zirakpur
- High School, Government Boys Senior Secondary School, Sector 15, Chandigarh

Professional internships:

- 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.

Volunteer Work:

- Student volunteer at children's hospital in Chandigarh.

Nipesh Singla

UNIT 11.4.3: Interview FAQs

Unit Objectives

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 time a team has completed their role play.
- Keep a check on time.

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:
 - What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Then, the interviewer will bluntly ask the following questions:
 - How do you explain this huge time 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 2

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, at the end of the interview, ask the interviewee:
 - ♦ There are over 200 people who have applied for this job, some with excellent work experience. Why should I hire you?

Say

De-brief:

- There is nothing wrong with stating your strengths and achievements. However, do not come across as arrogant or too boastful.
- You need show the interviewee that you have unique skills or talents to contribute to the company. The interviewer needs to know how you stand apart from the rest of the crowd.
- Tell the interviewer you are looking forward to working with the company and that you are a hard-working individual.

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:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ 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:
 - ♦ 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 favouritism?

Say

De-brief:

- 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

Conduct a role play for the situation given.

Role Play – Situation 4

- The interviewer will start by asking the interviewee a few generic questions such as:
 - What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Then very bluntly ask the interviewee:
 - How long do you plan to stay with this company if you are selected?
- After the candidate responds, ask sarcastically:
 - Do you seriously mean that?

Say

De-brief:

- 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.
- You can say something like, "I would like to stay with the company as long as I can contribute constructively and develop as an employee, within the organization, professionally and financially."

Role Play

Conduct a role play for the situation given.

Role Play – Situation 5

- The interviewer will start by asking the interviewee a few generic questions such as:
 - What is your name?
 - Tell me something about yourself?
 - Can you tell me something about your family?
- Ask him/her how important he/she thinks it is to be punctual in the corporate world.
- After he/she answers, look up sternly at the interviewee and in a crisp voice, say:
 - You were late for this interview by 10 minutes. That surely does not seem to be in line with what you just said?

Say

De-brief:

- Politely apologize for being late.
- You can add something such as, "I assure you this is not a habit". All your future actions should be in line with this statement.
- Avoid giving any excuses.
- You might feel obligated to provide a justification for your tardiness, but the interviewer is not interested in that.
- Do not over apologize. Once this response is out of the way, turn your focus back to the interview.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 6

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- After asking a few academic or job-related questions, ask the interviewee:
 - ♦ If you get this job, what salary package do you expect us to give you?

Say

De-brief:

- If there is no way 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:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, bringing the interview to a close, ask the interviewee:
 - ♦ 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 like:
 - ♦ When will I be informed about the results of the interview?
 - ♦ What are the working hours?
 - ♦ 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 actions, tone, and gestures neutral.
- Maintain your composure while answering personal question.

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 allotted for each situation is 30-35 minutes.

Activity **Mock Interview Questions**

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?

Summarize 

- Close the discussion by discussing the questions in the 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 11.4.4: Work Readiness – Terms and Terminology

Unit Objectives

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

- Identify basic workplace terminology

Resources to be Used

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens

Ask

- What do you understand by workplace terminology?
- Are offer letter and contract 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 De-brief

- Have the participants read out the words they have written
- Encourage all the participants to participate in the activity

Do

- 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.

Say

- 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 categorised further?

Say

- 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 flow chart of the hiring process of MND Company.

Activity De-brief

- Ask the groups to share the flow charts and the new terms they added while preparing the flow chart.

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 time. 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. She goes to the HR Department to get her doubts clarified. Can you think of the terms for which she wants clarity? Make a list of those words.

Activity De-brief

- Ask the groups to share their list of words. Some of the words are benefits, comp. time, 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 time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize 

- Note: You can either summarize the key points of the unit or have a role play where an employee has just joined a company and the HR Manager explains the terms of employment.



UNIT 11.5: Understanding Entrepreneurship

Key Learning Outcomes



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

1. Discuss the concept of entrepreneurship
2. Discuss the importance of entrepreneurship
3. Describe the characteristics of an entrepreneur
4. Describe the different types of enterprises
5. List the qualities of an effective leader
6. Discuss the benefits of effective leadership
7. List the traits of an effective team
8. Discuss the importance of listening effectively
9. Discuss how to listen effectively
10. Discuss the importance of speaking effectively
11. Discuss how to speak effectively
12. Discuss how to solve problems
13. List important problem solving traits
14. Discuss ways to assess problem solving skills
15. Discuss the importance of negotiation
16. Discuss how to negotiate
17. Discuss how to identify new business opportunities
18. Discuss how to identify business opportunities within your business
19. Explain the meaning of entrepreneur
20. Describe the different types of entrepreneurs
21. List the characteristics of entrepreneurs
22. Recall entrepreneur success stories
23. Discuss the entrepreneurial process
24. Describe the entrepreneurship ecosystem
25. Discuss the purpose of the Make in India campaign
26. Discuss key schemes to promote entrepreneurs
27. Discuss the relationship between entrepreneurship and risk appetite
28. Discuss the relationship between entrepreneurship and resilience
29. Describe the characteristics of a resilient entrepreneur
30. Discuss how to deal with failure

UNIT 11.5.1: Concept Introduction (Characteristic of an Entrepreneur, types of firms/ types of enterprises)

Unit Objectives

At the end of this unit, 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

Say

- Let's start this session with some interesting questions about Indian entrepreneurs.

Team Activity

Quiz Questions

1. Who is the founder of Reliance Industries?
Dhirubhai 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 (autorickshaw aggregator)
7. Who is the founder of OYO Rooms?
Bhavish Aggarwal

Do

- Tell them that you will ask them few questions about a few entrepreneurs.
- Divide the class in to 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 Facilitation

- 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 11.5.2: 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 breakdowns.
- 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.
- A boss takes credit whereas a leader gives credit.

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 **De-brief:**

- 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.

Summarize 

- 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 11.5.3: Communication Skills: Listening & Speaking: The Importance of Listening Effectively

Unit Objectives

At the end of this unit, 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 1

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 first heard 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 heard out loud and the first person reveals the real message.

Compare them and have a great laugh!

Ask

De-brief questions:

- Was the original message the same as the message that is communicated at the end of the game?
- Why do you think there was a difference in the messages?

Say

- No, the original message was not same at the end of 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.

Say

- 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.

Ask

- 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.

Say

- Let's play a game to understand effective listening process better.

Do

- 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 time.

Activity 2

Riddles:

Is there any law against a man marrying his widow's sister?

If you went to bed at eight o'clock at night and set the clock's alarm to ring at nine o'clock, how many hours of sleep would you get?

Do they have a 26th of January in England?

If you had only one match and entered a dark room that had a kerosene lamp, oil heater, and a wood stove, what would you light first?

The Delhi Daredevils and the Chennai Super Kings play five IPL matches. Each wins three matches. No match was a tie or dispute. How is this possible?

There was an airplane crash. Every single person died, but two people survived. How is this possible?

If an airplane crashes on the border of two countries, would unidentified survivors be buried in the country they were travelling to or the country they were travelling from?

A man builds an ordinary house with four sides except that each side has a southern exposure. A bear comes to the door and rings the doorbell. What is the colour of the bear?

Answers:

There's no law against a man marrying his widow's sister, but it would be the neatest trick in the book since to have a widow, the man would have to be dead.

You'd get one hour's sleep since alarm clocks do not know the difference between morning and night.

Oh, yes. They have a 26th of January in England. They also have a 27th, a 28th, and so on.

First of all, you would light the match.

Who said the Delhi Daredevils and the Chennai Super Kings were playing against each other in those games?

Every SINGLE person died, but those two were married.

You can't bury survivors under any law especially if they still have enough strength to object.

The bear that rang the doorbell would have to be a white bear. The only place you could build a house with four southern exposures is at the North Pole where every direction is in South.

Ask **De-brief question:**

- What were the barriers that came into your way of listening?
- How can you overcome barriers to listening?

Say 

- There is a difference between hearing and listening.
- If you don't listen properly, the message may be misunderstood.
- Be open-minded while listening to someone.
- It is important to listen effectively and carefully without making assumptions.

Activity 3 **Elevator Pitch:**

You are in the lift of a hotel and you bumped into your former client who is a famous businessman. He has financed a lot of small business ventures and can finance your new start-up too. After exchanging pleasantries, he asks you what your new company does. You open your mouth, and then pause. Where do you even begin?

Then, as you try to organize your thoughts, his meeting is called, and he is on his way. If you would been better prepared, you're sure that he would have stayed long enough to schedule a meeting with you too.

If you were given another chance, what would you have said to this person?

Do 

- Start off the task by providing a beginning sentence to get the story started, and then go around the classroom getting each one to add a new sentence to keep the story going.
- This task should be done spontaneously allowing only a little time to think (30 seconds).
- For example: **There was once a student who was looking for a job after graduation.**

Notes for Facilitation

- Tell the participants to follow these steps to create a great pitch, but bear in mind that you'll need to vary your approach depending on what your pitch is about.
 1. **Identify Your Goal:** Start by thinking about the objective of your pitch. For instance, do you want to tell the potential clients about your organization? Do you have a great new product idea that you want to pitch to an executive or do you want a simple and engaging speech to explain what you do for a living?
 2. **Explain What You Do:** Start your pitch by describing what your organization does. Focus on the problems that you solve and how you help people. Ask yourself this question as you start writing: what do you want your audience to remember most about you? Keep in mind that your pitch should excite you first. After all, if you don't get excited about what you're saying neither will your audience. People may not remember everything that you say, but they will likely remember your enthusiasm.
 3. **Communicate Your USP:** Your elevator pitch also needs to communicate your unique selling proposition or USP. Identify what makes you, your organization or your idea unique. You'll want to communicate your USP after you've talked about what you do.
 4. **Engage with a Question:** After you communicate your USP, you need to engage your audience. To do this, prepare open-ended questions (questions that can't be answered with a "yes" or "no" answer) to involve them in the conversation. Make sure that you're able to answer any questions that he or she may have.
 5. **Put it all Together:** When you've completed each section of your pitch, put it all together. Then, read it aloud and use a stopwatch to time how long it takes. It should be no longer than 20-30 seconds. Remember, the shorter it is, the better!

Example:

Here's how your pitch could come together:

"My company deals with cloth retail online business and we use various e-commerce platforms to sell our products. This means that you can do shopping with ease and spend time on other important tasks. Unlike other similar companies, we have a strong feedback mechanism to find out exactly what people need. This means that, on average, 95 percent of our clients are happy with our products. So, how can you help us in creating our own web portal?"

6. **Practice:** Like anything else, practice makes perfect. Remember, how you say it is just as important as what you say. If you don't practice, it's likely that you'll talk too fast, sound unnatural or forget important elements of your pitch. Set a goal to practice your pitch regularly. The more you practice, the more natural your pitch will become. Practice in front of a mirror or in front of colleagues until the pitch feels natural.

Summarize

- Close the discussion by summarizing how to speak effectively as discussed in the Participant Handbook.

UNIT 11.5.4: 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'?
- What do you think are the problems you may face in the process of becoming a successful entrepreneur?

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 tied 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 set up.

Do 

- 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 **De-brief questions:**

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?

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 organise 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.

Say 

- Discuss the important steps to negotiate as given in the Participant Handbook.

Role Play 

- 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.

Do 

- Divide them into groups of four (4) (depending on the batch size).
- Give them the hand-outs 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 atleast 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 one 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 Aggarbattis,. Your staff members do door to door selling and organise marketing campaigns in local markets. Your brand has established it's name in last few years.

Recently, lot 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 aggarbattis than they paid for.

Another set of customers lodged complaint about the misconduct and rude behaviour of a particular staff member.

You often hear from your customers that the orders don't get delivered on time or wrong products get delivered.

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?

Negotiation Scenario 1

You have interviewed a prospective new employee who could be a key member of your new entrepreneurial venture. The new person is demanding a salary that is 20% higher than you thought based on your business plan. Finances are tight, yet you believe this person could make a significant impact on future profits. If you paid the required salary for the new person, then you would have to restructure your entire business plan. You've been searching for an individual with this skill level for three months. to the candidate is waiting for your response. Now you have to call him in to make the final negotiations.

Negotiation Scenario 2

You are a young entrepreneur who has just registered his start up project and applied for a bank loan accordingly. You receive a letter saying that your loan application has been rejected as your start up idea did not appeal to the bank and they think that it is not a revenue generating model. You have taken an appointment to meet the manager and show your negotiation skills to get your loan approved.

Notes for Facilitation

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 and know how to address issues participants might raise during the activity.

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. Give the pairs/ groups 10 to 15 minutes to conduct the role-play (depending on the duration of the session).
5. After all the groups have finished with the role-play, conduct a debriefing session on each role-play.
6. 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.

Summarize

- Wrap the unit up after summarizing the key points and answering questions.

UNIT 11.5.5: Business Opportunity Identification: Entrepreneurs and Opportunities

Unit Objectives

At the end of this unit, 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 opportunity?

Say

- Let's talk about opportunity, common queries or concerns faced by entrepreneurs, idea 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

Strength

What are your strengths?
What unique capabilities do you possess?
What do you do better than others?
What do others perceive as your strengths?

Weakness

What are your weaknesses?
What do your competitors do better than you?

Opportunity

What trends may positively impact you?
What opportunities are available to you?

Threat

Do you have solid financial support?
What trends may negatively impact you?

Do 

- 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 time.
- Ask de-brief questions to cull out information from the participants.

Ask **De-brief questions:**

- What are your weaknesses according to your SWOT analysis?
- Do you think you can change your weakness into strength? How?
- Do you think you can work on your threats? How?

Summarize 

- 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.

UNIT 11.5.6: 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 eco-system?
- What do you think 'entrepreneurship support eco-system' means?

Say

- Let's learn what entrepreneurship support eco-system means.
- Discuss 'Entrepreneurship Support Eco-System' as given in the Participant Handbook.

Ask

- Can you define entrepreneurship support eco-system?
- What are the key domains of the support eco-system?

Say

- 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 support eco-system.

Team Activity

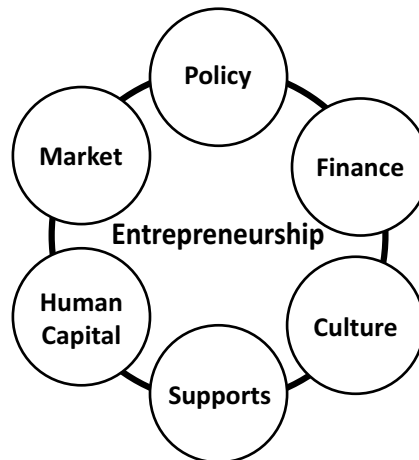
- Making a poster showing the entrepreneurship support eco-system.

Do 

- Divide the class into groups of four or six.
- Hand out chart paper and coloured 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 De-brief

Ask each group to display their poster and explain the key domains of entrepreneurship support eco-system.

**Ask** 

- What kind of government support eco-system is available for entrepreneurs in India?

Say 

- Discuss 'Make in India' campaign as given in the Participant Handbook.

Team Activity 

- Presentation on key schemes to promote entrepreneurs

Do 

- Divide the class into pairs.
- Number each pair from 1-15.
- 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 De-brief

- Ask each group to explain the scheme offered by government to promote entrepreneurs.

Summarize 

- Summarize the unit by discussing the key points and answering questions the participants may have.

UNIT 11.5.7: Risk Appetite & Resilience

Unit Objectives

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 people 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.

Say

- 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.

Say

- Let's learn more about risk appetite and resilience with the help of an activity.

Team Activity

Risk Appetite

- 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 De-brief

- 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 motive of Paytm was to transform India into a cashless economy.

After demonetization 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.

Say 

- Let's learn more about entrepreneurship and resilience with the help of an activity.

Team Activity **Entrepreneurship and Resilience**

- This is a group activity.
- Think of some entrepreneurship ventures that faced challenging times, but later resulted in success stories.
- Who is the founder of that company?
- What challenging times did it face?
- How did it overcome those challenges?
- List the resilient characteristics of the entrepreneur.

Activity De-brief

- 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 times, 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 11.5.8: Success and Failures

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 or face failure before 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.

Ask

- Have you felt or experienced fear?
- What led you to feel that emotion?
- How did you handle it?

Say

- Let's learn the 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 Facilitation

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

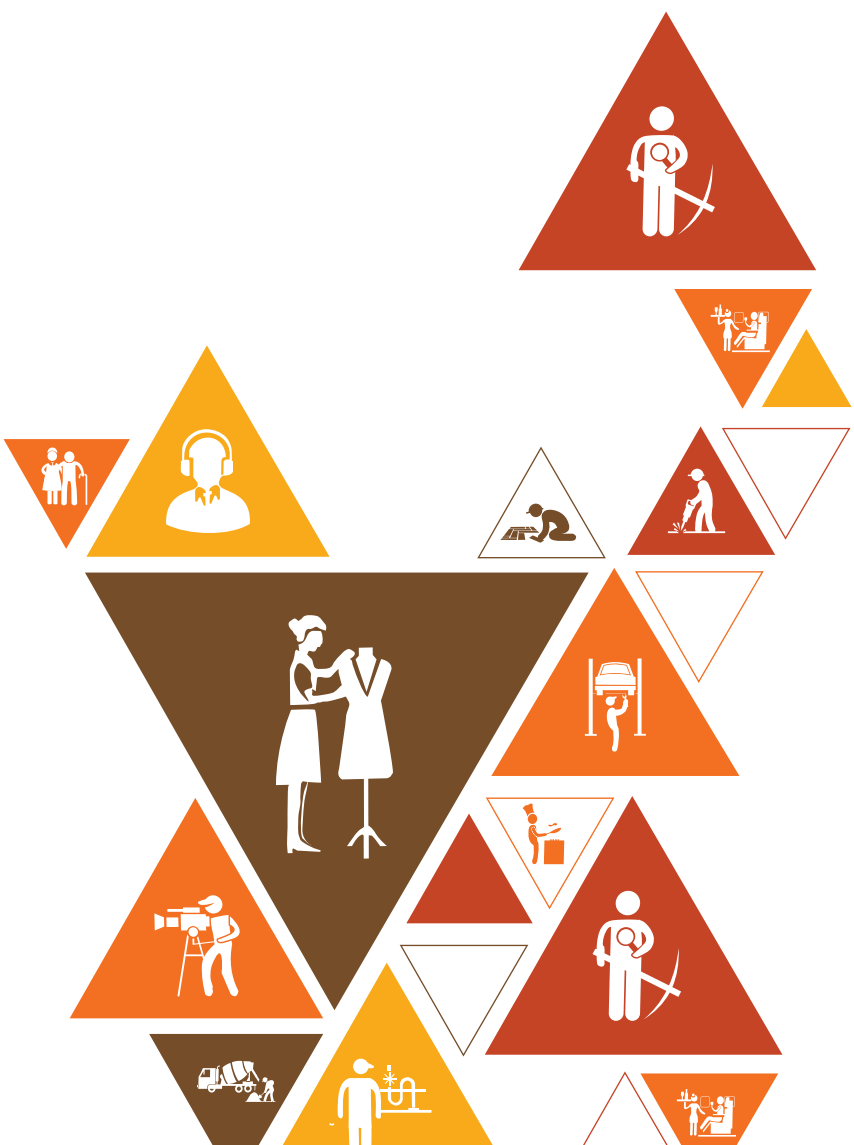
1. Introduce the activity. Emphasize that role playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
2. Ask participants to form pairs. Direct the members of each group to choose who will play 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 de-briefing 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 de-briefing 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.

Summarize

- Wrap the unit up after summarizing the key points and answering questions.

Notes

[illegible]



UNIT 11.6: 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 11.6.1: 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 4 Ps 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?

Activity De-brief

- Ask each group to come forward and give a brief presentation.
- Encourage other groups to be interactive and ask questions.
- What factors did you keep in mind while doing your research?
- Based on our research would you go ahead and open a tuition centre?

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 time. Tell the group to wind up quickly if they go beyond the given time limit.

Say 

- By opening a tuition centre you are offering a service.

Ask 

- 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 De-brief

- 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 a target 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 De-brief

- 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 wants 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.

UNIT 11.6.2: 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

Say

- 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 Facilitation

QUESTIONS FOR THE QUIZ

1. What does B2B mean?
Business to business
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 estimation of the overall worth of a business called?
Valuation
6. You are buying a house. What type of transaction is it?
Complex transaction
7. How will you calculate the net income?
Revenue minus expenses
8. How is Return on Investment expressed?
As percentage
9. How will you calculate the cost of goods sold?
Cost of materials minus cost of outputs
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 cost and total revenues are equal.
12. What is the formula used to calculate simple interest?
 *$A = P(1 + rt)$; $R = r * 100$*
13. What are the three types of business transactions?
Simple, Complex and Ongoing Transactions
14. The degrading value of an asset over time is known as .
Depreciation
15. What are the two main types of capital?
Debt and Equity

UNIT 11.6.3: 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 success 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:
 - Treating your customers with respect.
 - Be available as per their need/ schedule.
 - Handling complaints effectively.
 - Building long lasting relationships.
 - Collecting regular feedback.
- Handle customer complaints proactively. Ask “what happened”, “why it happened”, “how can it be avoided next time”, etc.
- Collecting feedback from the 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 analyse 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 bottom. 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 boutique 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 boutique have unique designs. Smita has to attend her cousin's wedding; she goes to Rajni's boutique 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?

Scenario 4

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 realize that she has not received the promised discount neither was there any mention of the free services. She immediately demands to see the Shailender. When Shailender's head asks how much discount Vinita was promised, he realised 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

- Now, let's discuss the problem and solution with the class.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Present the solution as a role play.
- Post presentation, the other groups may ask questions from the group that has presented.

Do 

- Congratulate each group for the presentation/ role play.
- Ask the audience to applaud for them.
- 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.

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 CRM and Networking for entrepreneurs.
- Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.

UNIT 11.6.4: Business Plan: Why Set Goals?

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 time limit did you set for your goal- 3 weeks, 3 years, 10 years?

Say

- Talk about short term, long term and medium 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.

Ask

- 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?

Say

- 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

Writing 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: What is your Mission Statement?
Business Description: What is the nature of your business?
Market Analysis: What is your target market?
Organization 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 fund is required and from where?

Say

- 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.

Say 

- 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.

Do 

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

Say 

- 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.

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.

Notes for Facilitation 

- Keep the business plan format ready in a flipchart to display it during the activity.

UNIT 11.6.5: Procedures and Formalities for Bank Finance

Unit Objectives

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

- Describe the procedure and formalities for applying for bank finance

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 start-up. 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, start-up capital poses an even a 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
 - **Crowd funding:** Funds are 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 capitals are professionally managed funds who invest in companies that have huge potential. They usually invest in a business against equity.
 - **Bank loans:** The most popular method in India.
 - **Microfinance Providers or NBFCs**
 - **Government programmes**
- Let us now discuss the most popular method i.e. bank finance in detail here.

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.

Summarize

- 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 Facilitation

- 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 nationalised bank's website. Print sufficient copies to circulate it amongst the groups.

CHECKLIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH LOAN APPLICATION (Common for all banks)	
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 concern/s for the last three years	
4. Copy of QIS II for the previous quarter ended on _____	
5. Operational details in Annexure I	
6. CMA data for the last three years, estimates for current year and projection for the next year	
7. Term loan/DPG requirements in Annexure II	
8. List of machinery in respect of machinery offered as security in Annexure III	
9. Additional details for export advances furnished in Annexure IV	
10. Property statements of all directors/partners/proprietor/guarantors	
11. Copies of ITAO of the company for the last three years	
12. Copies of ITAOs/WTAOs of the directors/partners/proprietor and guarantors	
13. Copies of certificate from banks and financial institutions certifying the latest liability with them	
14. Copy of board resolution authorizing the company to apply to your bank for the credit facilities mentioned in application	
15. Copy of memorandum and article of association (in case of limited company)/partnership deed (in case of partnership firm)	
16. Cash budget for the current year and next year in case of contractors and seasonal industries	

UNIT 11.6.6: 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 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, soft skills, and technology, and develop work ethics manual for managing his enterprise.

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 De-brief

- Have each group present their matrix.
- Encourage participants of the other groups to ask question 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 pen.
- 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.

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.
- Close the discussion by summarizing the importance of effective management to run an enterprise as given in the Participant Handbook.

UNIT 11.6.7: 20 Questions to Ask Yourself before Considering Entrepreneurship

Unit Objectives

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 one by one questions.
- 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 time and don't let the discussion get sabotaged or lose track of time. Ensure all the questions are covered and discussed.

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.

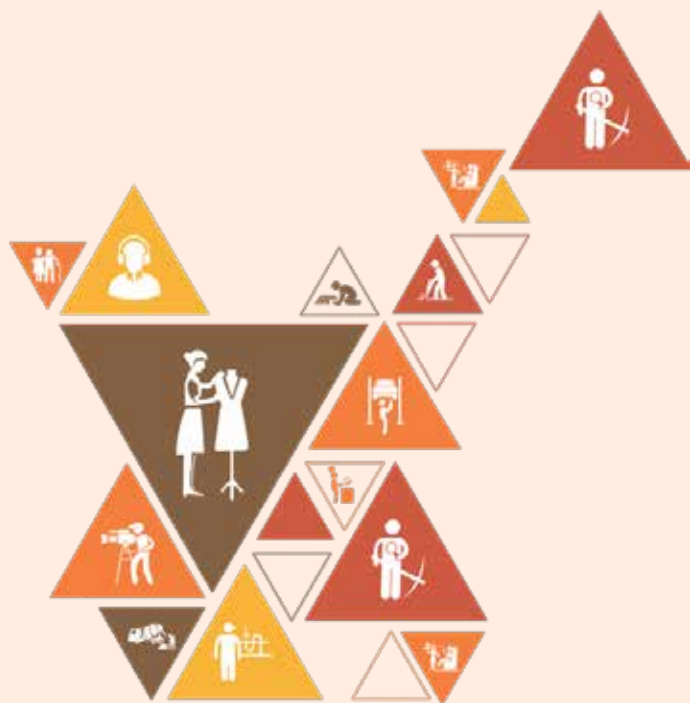
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12. Annexures

Annexure I: Training Delivery Plan

Annexure II: Assessment Criteria



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	Certificate Course in Fitter: Electronic Assembly		
Qualification Pack Name & Ref. ID	Fitter: Electronic Assembly - ISC/Q1101		
Version No.	1.0	Version Update Date	30-12-2015
Pre-requisites to Training (if any)	Minimum qualification – 12th standard (Science) / ITI Pass		
Training Outcomes	<p>By the end of this program, the participants will be able to:</p> <ol style="list-style-type: none"> 1. Assemble and wire up electronic equipment and systems to mechanical equipment 2. Use basic health and safety practices at the workplace 3. Work effectively with others 		

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration
1	Over view of Iron & Steel Industry	Icebreaker	<ul style="list-style-type: none"> • Introduce each other • Build rapport with fellow students and the facilitator 		Group Activity: Passing the Parcel	Available objects such as a book, pen, duster etc.	0.5 hours
2	Over view of Iron & Steel Industry	Overview of steel industry and steel industries in India	<ul style="list-style-type: none"> • Understanding Iron & steel industry • Understanding types of Iron & Steel Industry • Understanding products of Iron & Steel industry • Activities in Iron & Steel Industry 	NA	Facilitator-led-discussion Videos	PPTs of Iron and steel manufacturing, Charts showing the same	3.5 hrs

3	Occupational, Health and Safety (OHAS)	Hazards at the site, control measures, PPE, safe working at heights and confined spaces, safe working practices	<ul style="list-style-type: none"> • Understanding the Occupational health & Safety • Understand What is hazard • Working at Heights, confined spaces 	ISC/N0008 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC12, PC13 KB3, KB4, KB5, KB6, KB7, KB8, KB9, KB10, KB11, KB12, KB13	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety Material	13 hrs
4	Occupational, Health and Safety (OHAS)	Problem escalation, escalation matrix, accident reporting	<ul style="list-style-type: none"> • Documentation for Health and safety • Problem escalation 	ISC/N0008 PC25, PC26 KB21, KB22	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety Material	3 hours
5	5S & House keeping	5S safety system, waste management and housekeeping practices	<ul style="list-style-type: none"> • Identification of bottlenecks in functioning of work place • Various methods of housekeeping both pre-work & post-work as well 	ISC/N0008 PC10, PC11, PC12	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPTs of 5S, Display Charts of 5S, Audit Checklists of 5S	16 hrs
6	Understanding job requirements	Engineering drawing, reading and interpreting drawing, hand tools, electronic components and their functions, electronic symbols	<ul style="list-style-type: none"> • Understand about basics of electricity. • Knowledge of electronics machines • Know about electronics components • Reading values of electronics components • Functions and applications of electronics components • Polarity of electronic components • Accessories required for assembly i.e. 	ISC/N1101 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11 KB1, KB2, KB3, KB4, KB5, KB6, KB7, KB8, KB9, KB10, KB11	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPTs of various hand tools and measuring instruments, Electronic components – resistor, capacitor, diode, IC etc., cables, fasteners, connectors, mechanical drawings	124 hrs

			cables, fasteners, connectors etc <ul style="list-style-type: none"> • Using of hand tools • Using of measuring instruments • Understanding engineering drawing • Reading electronic symbols 				
7	Assemble and wire up electronic equipment and systems to mechanical equipment	Cable assembly, OCB assembly, machine assembly, software uploading and inspection tests	<ul style="list-style-type: none"> • Reading wiring diagram • Making cable assembly • Stripping and crimping of cable • Marking on cable • How to do soldering • PCB assembly • Assembling PCB board with mechanical equipment • Loading software in the equipment • Testing measure and control equipment • Analysing and reporting test results • Calibrating measure and control equipment • Escalating unsolved problem as per protocol • Process compliances 	ISC/N1101 PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20 KB12, KB13, KB14, KB15, KB16, KB17, KB18, KB19, KB20, KB21, KB22, KB23, KB24, KB25, KB26, KB27, KB28, KB29	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPTs of wiring diagrams, cable assembly procedure, stripping and crimping, soldering, electronic components assembly with mechanical equipment	124 hrs

8	Use basic health and safety practices at the workplace	Fire safety, use of fire extinguisher, fire drill, emergency rescue and first aid techniques	<ul style="list-style-type: none"> • Health and safety procedures • Fire safety procedures • Emergencies, rescue and first aid procedures 	ISC/N0008 PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC22, PC23, PC24, KB14, KB15, KB16, KB17, KB18, KB19, KB20	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	PPE, Different Type of Safety Sign, First Aid Box, Safety instrument and clothing, Step Ladder, Sample Accident reports, Fire Extinguishers, Items required for fire extinguisher and fire Safety	26 hrs
9	Work effectively with others	Effective communication, team work, workplace etiquettes	<ul style="list-style-type: none"> • Ensure appropriate communication with superiors, peers and others as applicable at work place • Demonstrate appropriate behaviour and etiquette at work place 	ISC/N0009 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA1, KA2, KA3, KA4	<ul style="list-style-type: none"> • Facilitator-led-discussion • Skill Practice (Activity) 	Communication skills PPTs, Posters Team management posters	16 hrs

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Fitter – Electrical assembly	
Job Role	Fitter: Electronic Assembly
Qualification Pack	ISC/Q1101
Sector Skill Council	Indian Iron & Steel Sector Skill Council

Sr. No.	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 proportion 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 part for each candidate at each examination/training centre (as per assessment criteria below)
4	Individual assessment agencies 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 60% 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.

				Marks Allocation	
Assessment outcome (NOS Code and Description)	Assessment criteria PC)	Total Marks	Out of	Assessment criteria (PC)	Total Marks
ISC/N1101: Understanding job requirements	PC1. Adhere to procedures or systems in place for safety, including personal protective equipment (PPE), other relevant health and safety regulations and guidelines	250	15	6	9
	PC2. Ensure that the components are free from damage, foreign objects, dirt or other contamination		15	6	9
	PC3. Check that tools and equipment to be used are in a safe, tested, calibrated and usable condition		20	8	12

	PC4. Where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (e.g. the use of grounded wrist straps and mats)		20	8	12
	PC5. Follow the relevant instructions, assembly drawings and any other specifications. Documents during the assembly activities: <ul style="list-style-type: none"> • Assembly drawings and charts • Interconnection net diagrams • Schedules of specified components • Wiring specifications • Wire running lists 		50	20	30
	PC6. Ensure that the specified components are available and that they are in a usable condition. Prepare components and complete the preparatory assembly: <ul style="list-style-type: none"> • Use hand tools/automated tools for securing all fastenings • Assemble sub-units to support housings • Assemble connectors and allied devices 		60	24	36
	PC7. Obtain, check and prepare consumables and specialized tools to be used for the wiring and interconnections. Check and prepare consumables and tools: <ul style="list-style-type: none"> • Older and any associated fluxes (e.g. Sufficient quantity, right type, good condition) • Wire strippers and cutters (e.g. Right size, good condition) • Authorized crimp tooling and attachments (e.g. Checked for sizes, calibration and condition) 		70	28	42

	<ul style="list-style-type: none"> Cables and individual wiring/ fibre optic links (e.g. Correct sizes and types, good condition) Cable strapping obtained and cut to nominal length (e.g. Right sizes and sufficient quantities) 		4	0	4
	NOS Total Marks	Total	250	100	150
ISC/N1101: Assemble and wire up electronic equipment and systems to mechanical	PC8. Use the appropriate methods and techniques to assemble the components in their correct positions. Methods and techniques: <ul style="list-style-type: none"> Set up, programme and use automated wiring termination equipment (where appropriate) Attach wire terminations by appropriate method/s (e.g. Soldering, crimping) Set out/position interconnection wiring Bundle/strap/tie wiring looms and cables Cut wires to required length Set out and terminate any fibre optic links Strip insulation from ends of wires assemble electronic equipment or systems, in compliance with one or more of the following: <ul style="list-style-type: none"> National and international wiring regulations National and international standards Company standards and procedures 	400	80	27	53
	PC9. Secure the components using the specified connectors and securing devices		30	12	18
	PC10. Obtain, check and prepare components, and complete the preparatory assembly		30	12	18

	PC11. Check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification. Preliminary checks on the completed work for the following: <ul style="list-style-type: none"> • Security of all assembled and interconnected items • Insulation resistance between housing assembly and interconnection wiring • Continuity of all interconnections • Unwanted short circuits between wires 		80	27	53
	PC12. Select the appropriate software		20	8	12
	PC13. Load appropriate software on electronic components in accordance with laid down procedures		25	9	16
	PC14. Check the output of software as per procedure		25	9	16
	PC15. Check the functionality of the completed electronic assembly		25	9	16
	PC16. Leave the work area in a safe and tidy condition on completion of the electrical equipment assembly activities use the correct issue of drawings, job instructions and specifications.		20	8	12
	PC17. Follow risk assessment procedures and regulations		15	6	9
	PC18. Follow clean work area protocols		15	6	9
	PC19. Carry out the assembling and wiring activities in line with organizational procedures		15	6	9
	PC20. Create and store records of the activities, in accordance with appropriate procedures		20	8	12
	NOS Total Marks	Total	400	147	253
ISC/N0008: Use basic health and safety practices at the workplace	PC1. Use protective clothing/ equipment for specific tasks and work conditions	200	10	3	7

	PC2. State the name and location of people responsible for health and safety in the workplace		10	3	7
	PC3. State the names and location of documents that refer to health and safety in the workplace		12	5	7
	PC4. Identify and rectify the problem areas during the functional tests		10	3	7
	Identify job-site hazardous work and state possible causes of risk or accident in the workplace		16	7	9
	PC5. Carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		10	3	7
	PC6. State location of general health and safety equipment in the workplace		10	3	7
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		12	5	7
	PC8. Work safely in and around trenches, elevated places and confined areas		10	3	7
	PC9. Lift heavy objects safely using correct procedures		10	3	7
	PC10. Apply good housekeeping practices at all times		12	5	7
	PC11. Identify common hazard signs displayed in various areas		5	2	3
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		10	3	7
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		5	2	3
	PC14. Demonstrate rescue techniques applied during fire hazard		10	3	7
	PC15. Demonstrate good housekeeping in order to prevent fire hazards		5	2	3
	PC16. Demonstrate the correct use of a fire extinguisher		5	2	3
	PC17. Demonstrate how to free a person from electrocution		5	2	3

	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		5	2	3
	PC19. Demonstrate basic techniques of		5	2	3
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		5	2	3
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		4	2	2
	PC22. Administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		4	2	2
	PC23. Demonstrate the artificial respiration and the CPR Process		10	3	7
	PC24. Participate in emergency procedures				
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible				
	PC26. Demonstrate correct method to move injured people and others during an emergency				
	NOS Total Marks	TOTAL	200	72	128
ISC/N0009: Work effectively with others	PC1. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	5	5
	PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	5	5
	PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand		10	0	10

	PC4. Display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	5	5
	PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	5	5
	PC6. Display appropriate communication etiquette while working		10	0	10
	PC7. Display active listening skills while interacting with others at work		10	0	10
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	5	5
	PC9. Demonstrate responsible and disciplined behaviors at the workplace		15	5	10
	PC10. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		5	0	5
	NOS Total Marks	Total	100	30	70

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.
- Explain that for the first NOS, 100 marks are allotted for Theory and & 150 for Skills Practical.

Notes

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings on the page.





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