



**Skill India**  
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**ASCI**  
Agriculture Skill Council of India

# Facilitator Guide



Sector  
Agriculture and Allied

Sub-Sector  
Agriculture Industries

Occupation  
Research & Development

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Soil and Water  
Testing  
Lab Analyst

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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. ”



## Acknowledgements

We would like to express our heartfelt gratitude to everyone, who in their own capacities or on behalf of their esteemed organisations, have contributed in various ways towards the development of this “Facilitator Guide” for Agriculture Skill Council of India (ASCI). This will go a long way in our endeavour to support the “SKILL INDIA” initiative.

The contents of this book are aligned to the Qualifications Pack - National Occupational Standards (QPNOS). This Facilitator Guide is dedicated to the passionate trainers who are committed to quality and excellence in the 'Agriculture and Allied' sector.

## About this Guide

This Facilitator Guide is intended to enable the participant to prepare himself/herself for serving as Soil & Water Testing Lab Analyst as per the Qualifications Pack (QP).

Qualification Pack is combination or set of different National Occupational Standards (NOS) essential to qualify for the certification of the Job Role. Every National Occupational Standards (NOS) is spread over Unit/s. Key Learning Outcomes for the NOS check the start of the Unit/s for that NOS. The images used as a part of this book are portrayed beneath. Soil & Water Testing Lab Analyst is in charge of Installation, and Testing for better management of the soil and water health, leading to increment in yield of produce. The National Occupational Standards indicate the measures of execution an individual must accomplish when doing a capacity in the work environment, together with the information and comprehension he/she has to meet that standard reliably. These word-related guidelines are appropriate both in the Indian and worldwide settings. This handbook would enable the participant to implement the learnings by enriching himself/herself in following critical pillars of success:

- **Knowledge and Understanding:** Satisfactory operational learning and comprehension to play out the required chore.
- **Performance Criteria:** Pick up the required aptitudes through hands on preparing and play out the required operations inside the predetermined measures.
- **Professional Skills:** Capacity to settle on operational choices relating to the zone of work.

The system additionally incorporates field visits for the participants where they can watch the method/operations of the soil and water testing. Chapters are prepared to build up the expert abilities like – choices making, systematic and basic considering. We hope you will help the participants to acquire knowledge with the help of the guide to make this programme a success to the recommended standards.

## Symbols Used



Resources



Time



Tips



Notes



Objectives



Do



Ask



Explain



Exercise



Activity



Demonstrate



Summary



Say



Elaborate



Facilitation Notes



Practical

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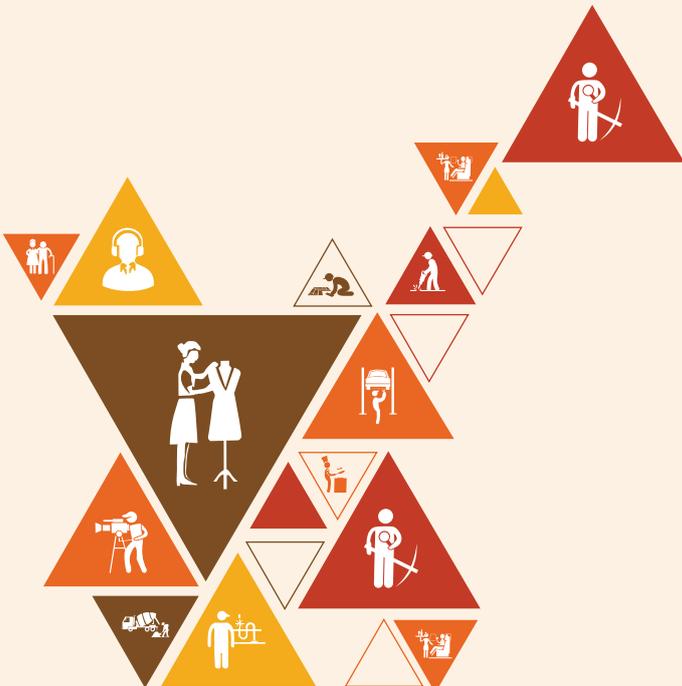
# 1. Introduction

Unit 1.1 – About the Training Programme

Unit 1.2 – Types of Soils and Nutrients

Unit 1.3 – Soil-water Test and Integrated Nutrient  
Management

Unit 1.4 – About the Job Role - Soil & Water Testing Lab  
Analyst



## Key Learning Outcomes



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

- Explain the general discipline in the laboratory.
- Identify the types of soils and nutrients.
- Explain the importance of Integrated Nutrient Management (INM).
- Recognise the role of Soil and Water Testing Lab Analyst.

## Resources to be Used



- Black/whiteboard and markers
- Marker
- Participant Handbook
- Projectors
- Laptop

## Time line



**Total time needed for the programme: 240 Hours**

Theory: 70:00 Hours

Practical: 170:00 Hours

## UNIT 1.1: About the Training Programme

### Unit Objectives

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

- Outline the overview of the training programme.
- Develop behavioural etiquette and technical instructions during the entire training programme.

### 1.1.1 Introduction

#### Expectation Mapping

1. During the Ice Breaker session, ask the participants to write their expectations from this course on a flip chart.
2. Write down the list of the topics that you are planning to cover in this course.
3. Compare the participants' flip charts with your list and read out their expectations that will be covered and also discuss their expectations that will be covered and also discuss their expectations that are out of scope in this programme.
4. On a chart write down the basic rules to be followed during this programme and display them in the class.
6. Make all the participants clear about these rules.

#### Benefits of this activity:

- Participants feel comfortable because their opinions are discussed in the class
- Help the participants to understand what to expect from this programme
- Help the facilitator to form an action plan to emphasise on certain topics

#### Minimum expectations from the participants:

- They must sign the attendance sheet once they arrive for the classes.
- To be interactive and confident.
- Maintain minimum discipline during classes.

Explain the contents that are going to be covered and relate them with their expectation mapping, which was done earlier.

By the end of this exercise, the participants should have a clear understanding of what to expect from the session and the areas that will not be covered.

## Conti...

### Defining the objectives:

- Define the objectives at very beginning of every unit, which helps to set the mood for that unit.
- Begin every unit with the participants' expectations. This will help them to connect with the topic effectively. For the facilitator, the unit objectives decide a specific path to progress on, so that the learning stays aligned and on track.
- Read the objectives slowly, one by one and ask the participants to explain what it means.
- At the end of every session, you can revisit the objectives to find out from the participants about how many objectives have been achieved.

### In order to effectively facilitate this workshop:

- Have thorough knowledge of the topics in the Participant Handbook and be prepared to answer any questions from the participants.
- Read other related material to enhance knowledge of the subject.
- Deal with the issues which may arise due to lack of time or knowledge. Ensure to obtain the answers and get back to the participants with relevant information. If necessary, turn a query into an assignment and guide the participants.
- Have a clear understanding of participant's expectations from the workshop.
- Make sure that all logistical arrangements are made for the workshop.
- Introduce small breaks in between a long session or extended workshop sessions.
- Invite discussions from the participants and enable them to feel confident.
- Let the participants involve in group discussions and answer all their questions.
- Ask any one participant to write all the points on the whiteboard that are covered during a session.
- As a conclusion of a discussion, plan additional sessions based on the answers provided by the participants.
- Make sure that all the teaching aids are available before starting of each session.

### General instructions for role playing:

**Note:** The purpose of the role play is to provide a situation in which you can practice certain skills.

1. 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.
2. You (and others) may benefit from the change in approach and behaviour. Therefore, try to use the approach you feel to be the most appropriate for the circumstances described in your brief.
3. Brief is just the starting point. It simply sets the scene and the tone of a session or an activity. Try not to keep referring to the brief as this will affect the spontaneity.

## Conti...

4. Allow the role play to develop as 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 the questions or to describe what has happened in the situation, do feel free to add your 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.

### 1.2.1 General Guidelines

Following are the general guidelines to be followed:

1. Read the Trainers Guide carefully before conducting the training. Familiarise yourself thoroughly with the domain knowledge as well as instructional style.
2. Ensure familiarity with the local language and culture.
3. Always enter the class at least 10 Minutes before the session.
4. Ensure all material/aids/equipment required for the training and activities (as per checklist) is ready and available, in advance.
5. Check the attendance at the start of every session/day. Keep track of absentees.
6. Ensure that all participants complete the required assessments. Maintain a careful record of assessment scores for every participant.
7. Always encourage participants. Never discourage participants from actively engaging in discussions.
8. Follow the lesson plan/session plan strictly.
9. Ensure key learning are captured at the end of each session.
10. Regularly check participants' workbooks to ensure all exercises are being completed on time.
11. Seek responses from participants on their experience, what they learnt and whether the learning objectives were met.
12. How do you test understanding of concepts taught, at the end of each session? Reserve the last 5 to 10 Minutes for a short test on the topic just covered. It could be in the form of multiple choice, true or false questions or a verbal quiz.

### 1.1.3: Ice Breakers

#### Activity

- Make the participants to sit in a circle.
- Give a ball to them and ask to pass it to the next participant, until you say 'stop.'
- Abruptly, say 'stop.'
- The person, who has the ball at that time, will give a self-introduction (name, hobbies, likes, dislikes) and will move out of the game.
- Start over the game again.
- Repeat this until only one person is left in the game.
- Declare that participant as the winner and ask him/her to give self-introduction.

Skill Practice	Time	Resources
Ice Breaker	30 Minutes	Tennis Ball

#### Notes for Facilitation

- Encourage shy the participants to provide information about themselves by prompting them with questions such as 'what do you enjoy doing the most', 'what is your favourite game or sports'.
- Motivate the participants by showing positive videos which will promote them to achieve something big in their life.

### 1.1.4: About the Programme

#### Explain

- About the training programme.
- The participant guidelines.

## Activity

Ask the class to open their Participant Handbook and complete the expectation mapping given in PH page.

Skill Practice	Time	Resources
Exercise	20 Minutes	Participant Handbook, Notepad, Pens

## Notes for Facilitation

- You can ask the the participants about their expectations from the course.
- Brief the the participants about the course, content of the programme and curriculum.
- Share the course timetable and schedule of the activities.
- Share the schedule about the learning they are going to cater periodically.
- Administer Do's and Don'ts for the the participants like discipline, timings, etc.

## UNIT 1.2: Types of Soils and Nutrients

### Unit Objectives

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

- Explain the types of soils and nutrients required for the plant growth.

### 1.2.1: Different Types of Soils

#### Say

Soils are essential for life, in the sense that they provide the medium for plant growth, habitat for many insects and other organisms, act as a filtration system for surface water, carbon store and maintenance of atmospheric gases.

Understanding different soil types is important because it decides the type of fertiliser required and the type of crop to be cultivated. Soil plays a big part in the way plants grow because of its relationship with the roots.

#### Explain

The following topics:

- Different types of soil
- Various minerals found in different types of soil

#### Activity

Ask the participants to make a group of 5 to 6 members each.

Give them a task of preparing charts on types of soil and their properties.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

#### Demonstrate

Samples of different types of soils and explain their properties.

## Notes for Facilitation

- Ensure that the participants are able to distinguish between different types of soil.
- Make the participants to summarise the properties of each type soil.

## 1.2.2: Types of Macro and Micro Nutrients Found in Soils

### Say

Macro and micro nutrients are very essential for the plant cultivation. Macro nutrients consists of nitrogen, phosphorus, potassium; where as micro nutrient consists of the Zinc, boron, sulphur etc. Micro nutrients act as enzymes in providing nutrition to the crop.

### Explain

- Group discussion types of macro nutrients found in soils.
- Discuss in group types of micro nutrients found in soils.

### Activity

Ask the participants to discuss in group the types of macro and micro nutrients along with their importance.

Skill Practice	Time	Resources
Group Discussion	1 Hour	Participant Handbook, Notebook, Pen

## Notes for Facilitation

- Differentiate between macro and micronutrients.
- Classify the macro and micronutrients.
- Briefly explain the role of nutrients in the soil.

## UNIT 1.3: Soil-water Test and Integrated Nutrient Management

### Unit Objectives

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

- Explain the importance of soil and water testing.

### 1.3.1: Significance of Soil and Water testing

#### Explain

- What Importance of soil analysis and water testing . Refer to this section in Participant Handbook soil analysis?
- What is water testing?
- What is the significance of soil and water testing?

#### Elaborate

##### **Soil Analysis or Testing:**

A soil analysis is a process by which elements such as P, K, Ca, Mg, Na, S, Mn, Cu and Zn are chemically extracted from the soil and measured for their “plant available” content within the soil sample.

##### **Water Testing:**

Once the source of water is identified, water to be used for irrigation should be tested to determine the quality of the water to be used for irrigation, to aid in the choice of fertilisers for optimum plant growth, and to minimise the risk of discharging pollutants to surface or ground water.

##### **Significance of Soil and Water Testing:**

- It helps to know the nutrient status of the soil.
- It helps to prevent over/under use of fertilizers.
- It helps to predict the nutritional values needed for crop production.
- Water testing helps us to understand the quality and potability of water.

#### Demonstrate

Soil and water testing in the laboratory.

#### Notes for Facilitation

- Brief them on the significance of soil and water lab testing.
- Make sure that each participant is familiar with the soil analysis and water testing process.
- Clarify all the doubts of the participants.

## UNIT 1.4: About the Job Role - Soil and Water Testing Lab Analyst

### Unit Objectives

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

- Discuss about the role of Soil and Water Testing Lab Analyst.
- Know the general discipline in the laboratory.

### 1.4.1: Roles and Responsibilities of the Lab Analyst

#### Say

**Role:** A prescribed or expected behaviour associated with a particular position or status in a group or organisation.

**Responsibility:** It is a state or fact of having a duty to deal with something and being accountable.

#### Explain

- The job role of a Soil and Water Testing Lab Analyst.
- The roles and responsibilities of a Soil and Water Testing Lab Analyst.

#### Activity

Call upon some participants and divide them into group and give a task of preparing charts on:

- Roles and responsibilities of Soil and Water Testing Lab Analyst.
- Skills required for Soil and Water Testing Lab Analyst.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

### 1.4.2: General Discipline in the Laboratory

#### Say

Discipline is important for smooth and trouble-free operation in all workplaces. However, it is even more significant in a laboratory because of the presence of toxic and hazardous materials and the nature of operations that are routinely carried out.

## Explain



Switch off all the mobile phones or keep them in silent mode.

- Immediately place all the reagent bottles to their respective shelves after use.
- Do not through the waste filter paper, burned up matchsticks etc into the sinks.
- Immediately report to the supervisor or lab assistant if there are any breakages of apparatus, accidents or injuries occur.
- Do not eat, drink, smoke or make any unnecessary noise in the laboratory.
- Carry out only the authorised experiments.
- Handle the electrical and electronic equipment with care.
- Keep the benches and work areas tidy.
- Switch off water, gas and electricity supplies before leaving the laboratory (unless otherwise specified by the supervisor).
- Be aware of the location of all fire-fighting equipment and learn how to operate them.
- In an emergency, the technician-in-charge has the authority to evacuate the area. Evacuation orders must be followed.
- Report all accidents and damages to the technician-in-charge or the departmental safety representative.

## Activity



Ask the participants to summarise the types of disciplines and attire to be followed inside the laboratory.

Skill Practice	Time	Resources
Question and Answer	20 Minutes	Participant Handbook, Notepads, Pens

## Notes for Facilitation



- Administer Do's and Don'ts for the the participants like discipline, timings, etc.
- Ensure that the participants understand the importance of maintaining discipline in a laboratory.

## Summary



In this chapter, the participants have learnt about:

- Types of soils and nutrients.
- Soil-water test and integrated nutrient management.
- Roles and responsibilities of a Soil and Water Testing Lab Analyst.

## Exercise

Briefly answer the following questions:

1. List the different types of soil and their nutrient enrichment.

- **Alluvial soil** - Alluvial soil is rich in Potassium but deficient in Nitrogen and Phosphorus
- **Black Soil** - Black soil is very rich in the iron also contain high quality of magnesia, lime and alumina.
- **Red and yellow soil** - They are usually poor growing soils, low in nutrients and humus and difficult to cultivate because of its low water holding capacity.
- **Laterite soil** - It contains the iron oxide minerals goethite  $\text{HFeO}_2$ , lepidocrocite  $\text{FeO(OH)}$  and hematite  $\text{Fe}_2\text{O}_3$ .
- **Arid and desert soils** - Arid soils typically contain high levels of calcium carbonates, gypsum, as well as sodium.
- **Saline and alkaline soil** - When the soil contains excess of sodium salts and clay complex still contains exchangeable calcium. Such soils may or may not contain excess salts.
- **Peat and marshy soil** - The soils are black and heavy and highly acidic and contain rich organic matter but deficient in phosphate and potash.
- **Forest and mountain soil** - The property of the soil is heterogeneous in nature and rich in humus and deficient in the potash, phosphorus and lime

2. What are the different types of macro and micronutrients found in the soil?

Macronutrients elements	Micronutrients elements
• Nitrogen (N)	• Iron (Fe)
	• Chlorine (Cl)
• Phosphorus(P)	• Manganese (Mn)
	• Molybdenum (Mo)
	• Copper (Cu)
• Potassium (K)	• Calcium (Ca)
	• Magnesium (Mg)
	• Zinc (Zn)

3. Explain the significance of soil and water lab testing.

- It helps to know the nutrient status of the soil.
- It helps to prevent over/under use of fertilisers.
- It helps to predict the nutritional values needed for crop production.
- Water testing helps us to understand the quality and potability of water.

## Exercise

4. Define the responsibilities of an Soil and Water Testing Lab Analyst.

### **The roles and responsibilities of the Lab Analyst:**

- The lab analyst supervises lab assistant for proper upkeep of the laboratory equipment.
- The lab analyst will assist in the logistics and coordination of experiments along with the observations being carried out in the laboratories.
- The lab analyst supervises the laboratory assistant to ensure that the laboratory is stocked with the necessary supplies or not.
- The lab analyst helps the lab assistant in maintaining the departmental lab records as required.
- The lab analyst supervises the lab assistant to keep laboratory floor dry and clear of all objects.
- The lab analyst supervises the lab assistant and the participants in wearing the Personnel Protective Equipment (PPE) in the laboratory.
- The lab analyst performs the recommendations of the fertilisers and other parameters in the Soil Health Card.
- The lab analyst monitors the data taken down by the lab assistant.







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## 2. Sanitation and Safety Guidelines of the Lab

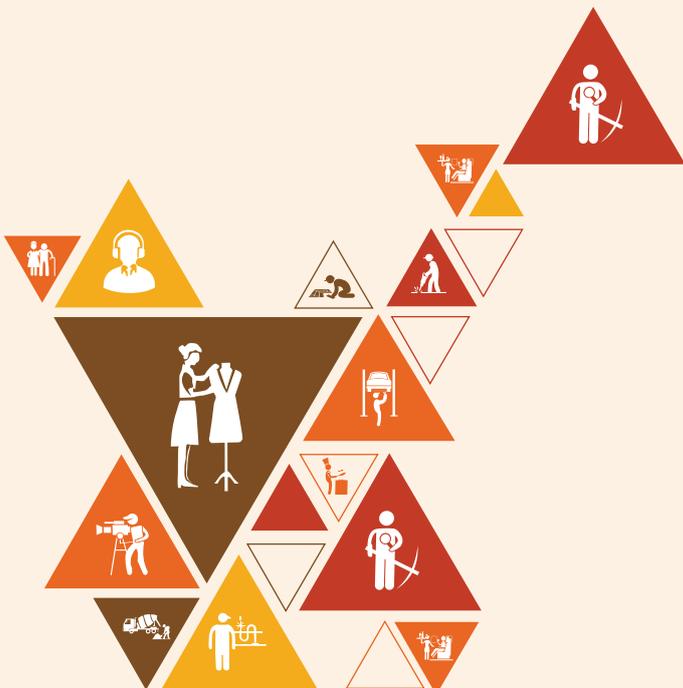
Unit 2.1 – Lab Layout and Apparatus

Unit 2.2 – Personal Hygiene and Lab Sanitation

Unit 2.3 – Preliminary Manoeuvres of Laboratory

Unit 2.4 – Disposal of Hazardous Waste

Unit 2.5 – Safety Precautions and First-aid Application



## Key Learning Outcomes



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

- Outline the layout and the equipment handled.
- Make use of personal hygiene and lab cleanliness.
- Summarise the initial procedures of lab.
- Identify the hazardous waste and disposal.
- Interpret the emergency and safety procedures.

## Resources to be Used



- Laptop
- White board
- Marker
- Projector
- Audio-vidual aids
- PPE
- First-aid kit
- Phone directory
- Search lights
- Fire extinguisher

## Time Line



**Total time needed for facilitation - 20:00 Hours**

- Theory Duration - 5:00 Hours
- Practical Duration - 15:00 Hours

## UNIT 2.1: Lab Layout and Apparatus

### Unit Objectives

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

- Define the laboratory layout and chambers.
- Discuss the apparatus and equipment used inside the laboratory.

### 2.1.1: Layout of the Lab and Chambers

#### Say

Lab layout can be defined as the modular construction of the equipment according to the need, preference, equipment and activities.

#### Explain

- About the lab layout.
- The types of chambers in a soil and water testing lab.

#### Elaborate

The typical lab layout and its chambers with the help of the figure given below:

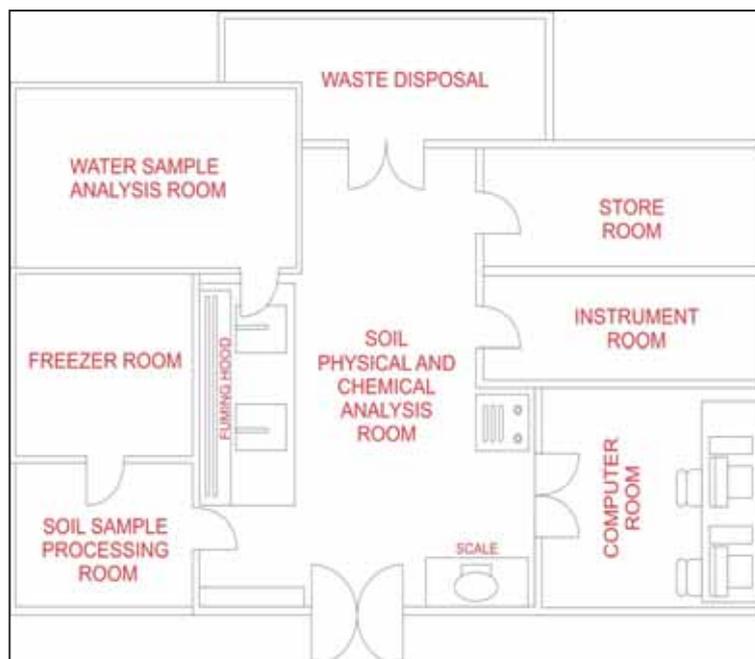


Fig 2.1.1 Typical Layout of Lab and Chambers

**Do** 

Visit a soil and water testing lab along with the participants to have a better understanding of its layout and chambers.

**Ask** 

- Name the types of chambers in a soil and water testing lab.
- The participants to draw a schematic diagram of the lab and its chambers.

**Notes for Facilitation** 

- Make the participants to discuss the key observations after the soil and water testing lab visit.
- Clarify all the doubts of the participants.

## 2.1.2: Apparatus and the Equipment

**Say** 

Apparatus is defined as a collection of technical equipment or machinery, which are essential for a particular activity. Apparatus is having a significant requirement for quantitative analysis of the chemical reagents.

**Explain** 

- What are lab apparatus and equipment?
- The types of lab equipment that are used in soil testing laboratory.

**Elaborate** 

The soil testing laboratory mainly consists of the following equipment:

- Soil sample collecting equipment:
  - Soil probes or soil samplers
  - Soil augers
  - Soil sample collecting bags
  - Shovels and scoops
- Soil sample preparation equipment:
  - Sieving and shaking equipment

## Elaborate

- Orbital shaking incubator
- Extractant or standard solution
- Soil physical analysis equipment:
  - Measuring tools
  - pH meter
  - Moisture meter
- Soil chemical analysis equipment:
  - Chemical reagents
  - DTPA solution (Diethylenetriaminepentaacetic acid) or water
  - Glassware (conical flask, funnel, burette and pipette, etc.)
  - AAS machine (Atomic Absorption Spectrometer)
- Storage or freezer room:
  - Set point freezers
  - Refrigerating units with UV protection

## Demonstrate

The lab apparatus and equipment and explain their uses.

## Activity

Take the participants to a lab and ask them to operate the apparatus and equipment as per the demo.

Skill Practice	Time	Resources
Operating the Lab Equipment	1 Hour	Participant Handbook, Notepads, Pens, Lab apparatus and Equipment.

## Notes for Facilitation

- Make sure that all the participants are familiar with all the lab apparatus and equipment.
- Ensure that all the participants are well aware on how to operate the lab equipment.

## UNIT 2.2: Personal Hygiene and Lab Sanitation

### Unit Objectives

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

- Interpret the importance of the personal hygiene.
- Summarise the Do's and Don'ts in the lab.
- Adapt to the maintenance and cleanliness of the lab.
- Organise the reagents arrangement.

### 2.2.1: Personal Hygiene

#### Say

Personal hygiene is of greater importance in all laboratory environments. It adheres to both safety and quality of individual and their process. Personal hygiene contributes to create an accident free environment.

#### Explain

- What is the importance of maintaining personal hygiene?
- How to ensure the personal hygiene at a workplace?

#### Elaborate

Personal hygiene is compulsory inside the soil testing lab and to ensure the personal hygiene the following points have to observe:

- Use clean and tidy clothes. Change the soiled clothes after each lab session.
- Make use of recommended soaps and sanitisers after the experiment.
- Use Personal Protective Equipment (PPE) inside the lab.
- Avoid wearing hand bracelet and the jewelleryes during the lab session.
- Cover the cuts, wounds and boils with proper adhesive bandages.
- Summarise the importance of different chemical reagents before using them.
- Adhere to safe disposal practices of hazardous chemicals and broken glassware.
- Follow the standard operating procedures while using chemicals.

## Activity

- Ask the participants to make a group of 5 to 6 members each.
- Give them a task to perform a role-play on how to ensure personal hygiene in the lab.

Skill Practice	Time	Resources
Role-play	1 Hour	Participant Handbook, Notepads, Pens

## Notes for Facilitation

- Brief the participants on the importance of maintaining personal hygiene.
- Encourage them to follow good hygiene practices.

## 2.2.2: Do's and Don'ts in the Laboratory

### Say

To ensure personal safety and occupational accuracy, there are certain Do's and Don'ts to be followed.

### Explain

#### Do's

- Stay alert and report any suspicious activity.
- Suggest the good hygiene practice inside the lab.
- Communicate and coordinate with the supervisor in case of any potential threat.
- Understand the correct handling procedures of all the chemical reagents.
- Ensure personal safety at all place of the laboratory.
- Use Personal Protective Equipment (PPE).
- Dispose broken glassware and hazardous chemical wastes safely and wisely.
- Familiarise with emergency equipment location and their usage.
- Always store the chemicals in cool, dry and well-ventilated places.

#### Don'ts

- Eat, smoke, drink inside the lab.
- Disturb the co-workers.
- Use mobile phones and photography inside the lab.
- Use laboratory equipment and the lab coat (apron) outside the lab.
- Enter the lab when feeling sick and ill.
- Use the reagents and the apparatus without knowing their operation completely.
- Conduct experiments in unclean workbenches.
- Provide fuming hoods near the storage areas.

## Activity

- Ask the participants to make a group of 5 to 6 members each.
- Give them a task to perform a role-play on the Do's and Don'ts followed in a lab.

Skill Practice	Time	Resources
Role-play	1 Hour	Participant Handbook, Notepads, Pens

## Notes for Facilitation

- Give a detailed explanation on the importance of knowing the Do's and Don'ts of a lab.
- Motivate the participants to follow the Do's and Don'ts of the laboratory.

## Elaborate

The main sanitation procedures are as follows:

- Maintain cleanliness and tidiness inside the laboratory.
- Clean the laboratory at least twice a day.
- Maintain the freezers, refrigerators and other storage places periodically.
- Wash and wipe thoroughly throughout the workplaces and the storage room.
- Ensure that storage room and fuming hoods are properly cleaned; if not, clean them before starting of soil testing.
- Chemical that produce fumes should not be placed near the freezers or refrigerators.
- Close the lid/caps of the containers having the chemical reagents.
- Wash the glassware and other apparatus with the appropriate disinfectant.
- Rinse and safely sterilise the equipment and glassware with disinfectant before and after the experimentation.
- Dry or dehydrate the laboratory utensils, equipment and instruments at the beginning and at the end of the experiment.
- Place the personal items such as purses, wallets, books and other items outside the laboratory and away from the chemicals.
- Use hot soapy water, sanitisers and the disinfectant for the sanitation procedure.
- Turn off the equipment when not in use.

## Demonstrate

The pictures of clean and sanitised laboratory.

## Notes for Facilitation

- Briefly explain the effects of sanitising a laboratory.
- Ask the participants to discuss on what are the effects if a laboratory is not sanitised.

## 2.2.4: Appropriate Arrangement of Reagents

### Say

Arrangement of the chemicals and reagents in a laboratory is organising them in a compatible and in a very convenient way. There are several ways of arranging the chemicals in the lab, but they are inter-related to each other with slight dissimilarities.

### Explain

- What is the need to arrange the chemicals in a laboratory?
- The advantages of organising the chemicals in a laboratory.

## Elaborate

About the guidelines to be followed while arranging the chemicals and reagents Fig 2.2.4 (a) on Arrangement of reagents in Participant Hand book for discussion.

S. No.	Guidelines	Causes	Remedies
1	Always keep the flammable chemicals away from fire/ignition sources.		
2	Avoid placing of the chemicals near the fuming hood; instead provide separate fuming for separate reagents.		
3	Label the reagents by grouping them according to their property.		
4	Safeguard the chemicals and reagents from theft.		

## Ask

- How to provide fuming hoods in the laboratory?
- Where are chemicals and reagents to be stored?

## Notes for Facilitation

- Ask the participants to share their opinion about the arrangement of the reagents.
- Classify the chemicals as flammable and non-flammables.
- Clarify all the doubts of the participants.

## UNIT 2.3: Preliminary Manoeuvres of Laboratory

### Unit Objectives

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

- Make use of the Personal Protective Equipment (PPE).
- Perform the pre-check and disinfect the equipment.
- Interpret the glassware cleaning procedure.
- Perform the sterilisation of the apparatus.

### 2.3.1: Personal Protective Equipment

#### Explain

- What is PPE?
- The types of PPE, their characteristics and application (refer page 17 in the Participant Handbook).

#### Ask

- What are the leading causes of accidents in a workplace?
- How to prevent accidents at a workplace?

#### Activity

- Ask the the participants to assemble and form groups.
- Demonstrate how to use various PPE in the workplace.
- Ask the the participants to do this activity individually and gain practice.

Skill Practice	Time	Resources
Use of PPE in a Workplace	2 Hours	Participant Handbook, PPE

#### Notes for Facilitation

- Motivate the participants to use the PPE.
- Tell the participants about which PPE has to be used in what situation.
- Brief them about the importance of using the PPE.

## 2.3.2: Pre-checks in the Lab

### Say



Soil testing laboratory is analysis type of laboratory, where accuracy and precision at the outcomes is of greater significance; therefore there must be some pre-checks to be done before conducting the testing of a sample.

### Explain



The major pre-checks are as follows:

- Sample collection is the first phase of testing, where appropriate sample should be collected. If a sample collection manual is present it is of a best choice.
- Check the certification of chemicals and reagents before conducting testing.
- Ensure that chemicals and equipment required for the experiment should be of adequate quantity.
- Calibrate the equipment like, incubators, spectrometers, ovens, water bath and refrigerator before conduction of testing.
- Arrange the workbench only with the required reagents and equipment for the testing.
- Ensure that the glassware and the equipment are cleaned and sterilised properly.
- For reagent preparation, use only reagent-grade water according to the IS1070:1992 of Bureau of Indian Standards (BIS).
- Create an accession list (record of all parameters of sample collected) before testing.
- Be aware of the harmful and flammable reagents used in the testing.
- Dispose the wastes and residues wisely and safely.
- Ensure that eye-cleaning, hand washing and fire extinguishers facilities are available in lab; if in the case it is unavailable organise it for the after-use.
- Check all the safety equipment and PPE's reliability periodically.

### Activity



- Take the participants to a lab.
- Demonstrate the pre-checks to be done before the testing.
- Ask the participants to perform as per the demo.

Skill Practice	Time	Resources
Lab Pre-checks	1 Hour	Participant Handbook, Notepads, Pens

### Notes for Facilitation



- Brief them on the importance of pre-checks.
- Ensure that all the participants perform the pre-checks.

### 2.3.3: Glassware Cleaning Procedures

Say



Cleaning the glassware is very important because stubborn residue adhered to glassware affects the chemical reaction. Soil and water testing laboratory uses glassware made out of the Borosilicate glass, grounded to make it harder and to obtain high temperature resistance. Even though the glassware used is susceptible to breakage, there may have more possibility for the breakage while handling or cleaning.

Explain



The procedure to be followed while cleaning glassware.

The classification of the cleaning process:

- Cleaning before testing
- Cleaning after testing
- Cleaning the adhered residue

Ask



- What are the different procedures followed during the cleaning of glassware?
- How do you take care for the cleaning of the residues?

Notes for Facilitation



- Ask the participants to discuss on the importance of sanitation.
- Ask the participants to remember the procedures followed in cleaning the glassware.
- Promote the sanitation of the glassware at the lab after use.

## 2.3.4: Sterilisation and Disinfection of the Equipment

### Say

Sterilising is a process designed to deactivate or destroy the microorganisms or any life forms present on equipment.

### Explain

- The importance of sterilisation process in a lab.
- The two methods used in sterilisation process.

### Elaborate

Sterilisation of the equipment can be done by two methods:

- **Physical method**
  - Drying: cold drying, hot drying etc.
  - Heat sterilisation: boiling, oven heating, autoclave etc.
  - Filtration: membrane filtering, air filtering etc.
  - Radiation: X-rays, UV-treatment, etc.
- **Chemical method**
  - Chemical reagents such as alcohols, aldehydes, halogens, phenols etc., are used in sterilisation.

### Ask

- What are the two methods used in sterilisation process of an equipment?
- Name the chemical reagents used in sterilisation.

### Practical

- Take the participants to the laboratory.
- Demonstrate how to sterilise an equipment.
- Ask the participants to perform as per the demo.

### Notes for Facilitation

- Ask the participants to discuss the importance of sterilisation and disinfection of an equipment.
- Make sure that all the participants perform the activity and understand the procedure.

## UNIT 2.4: Disposal of Hazardous Waste

### Unit Objectives

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

- Identify the methods for handling toxic materials.
- Summarise the procedures for cleaning of spills.
- Classify the waste and their proper disposal.

### 2.4.1: Toxic Chemicals Handling

#### Say

Safe handling of the toxic materials is of the vital importance inside the laboratory. Every individual's health and safety depends on safe handling of the toxic materials during operation.

#### Explain

- The importance of safe handling of a toxic chemical.
- The disposal of toxic chemicals.

#### Ask

- What is the importance of safe handling of a toxic chemical?
- List the major precautions to be taken while handling toxic chemicals.

#### Demonstrate

The method of handling toxic chemicals and its disposal methods.

#### Notes for Facilitation

- Ask the participants to remember the procedures followed in disposal of waste.
- Motivate to participants to dispose the unwanted waste.
- Encourage the participant to recycle the waste if possible.

## 2.4.2: Cleaning of Spilled Chemicals

### Say

A spill may be defined as the nothing more than inconvenience caused, if handled improperly.

### Explain

- What are the reasons for a spill.
- Why is it important to clean a chemical spill.

### Elaborate

The following steps are followed during the spill clean-up:

- Prevent the spread of spills (especially if spill is a liquid or vapour state) by providing ventilation or through fuming hoods.
- Neutralise the spill with the acid or base before removing it, use acid if the spill is basic, use base if the spill is of acidic nature.
- Control the spread of the spill by utilising the absorbent such as vermiculite, cat litter, or spill pillows etc.
- If spill is of flammable in nature, turn off the ignition sources and the electrical appliances then remove the spill immediately.
- Spill is of the toxic in nature, alert the people in area to avoid breathing in the area, evacuate and then remove the spill by splashing of water or other reagent.
- Always maintain a spill kit containing necessary absorbents, neutralisers, etc., to clean the spill.
- Label the bag with a spill waste and include it in the hazardous waste collection.

### Demonstrate

The steps to be followed for cleaning a spill.

### Notes for Facilitation

- Ensure that the participants understand the importance for cleaning a spill.
- Brief them on the precautions to be taken, to avoid spills.

## 2.4.3: Disposing Chemicals and Broken Glassware

### Explain



- The general principles followed during the disposal.
- The types of waste generated inside the laboratory (refer page 29 in the Participant Handbook).

### Elaborate



The general principles that are followed during disposal are illustrated in the flow chart.



Fig 2.4.3 (a) Steps in Waste Management

### Activity



- Take the participants to the laboratory.
- Demonstrate the steps involved in waste management.
- Ask the participants to perform as per the demo.

Skill Practice	Time	Resources
Waste Management Procedure	1 Hour	Participant Handbook, Notepads, Pens

### Notes for Facilitation



- Refer page 29 in the Participant Handbook and explain the types of waste generated in a lab disposal methods.
- Ask the participants to remember the procedures followed in disposal of waste.
- Motivate to participants to dispose the unwanted waste.
- Encourage the participants to recycle the waste if possible.

## UNIT 2.5: Safety Precautions and First-aid Application

### Unit Objectives

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

- Identify safety precautions laid by the manufacturer for instruments.
- Administer the first-aid for the person in need.
- Use the fire-extinguisher in the emergency situations.
- Control the operational risks and follow the workflow instruction.

### 2.5.1: Manufacturers' Safety Precautions for the Instruments

#### Elaborate

Many accidents in research laboratories result from the incorrect use of equipment and the instruments.

- Refer the operating manual/user manual of the instrument before starting the operation. The manual contains safety precautions to be taken while operating and maintenance of the equipment.
- The operating manuals of instrument must be located at an easily accessible location or the range of reach in the laboratory.
- New technician must undergo the operation of instrument under guidance of senior or researchers.
- Switch off and unplug the instruments while making adjustments.
- Calibrate the instrument periodically and keep a maintenance log of the inspection.
- Emergency stop switch must be used in the most critical conditions.
- Refer the caution signage or warning signage about the hazard.

#### Activity

Ask the participant to make a group of 5 to 6 members and discuss among themselves about safety precautions laid by the manufacturer for the equipment.

Skill Practice	Time	Resources
Group Discussion	1 Hour	Participant Handbook, Notepads, Pens

#### Notes for Facilitation

- Ask the participants about the safety precautions carried out at the laboratory.
- Show some examples of the caution boards laid by the manufacturer for equipment safety.
- Clarify all the doubts of the participants.

## 2.5.2: First-aid and its Administration

### Explain



- The main objective of First-aid
- General rules to be followed as a First Aider
- First-aid kit

### Elaborate



The basic first-aid kit contains the following components:

- Scissors
- Tweezers
- Adhesive bandages
- Tincture or antiseptic liquids
- Tapes
- Thermometer
- Surgical clean cotton
- Painkillers such as paracetamol, aspirin etc.
- Instant ice pack
- Distilled water and saline pack etc.

### Demonstrate



How to perform first aid for a person in need.

### Notes for Facilitation



- Conduct a skill practice activity on first aid.
- Introduce the different equipment that are included in the First-aid kit.
- Brief the participants about the situation and type of first-aid to be employed.

## 2.5.3: Fire-extinguisher

### Explain



- What is meant by fire extinguishing?
- The situations when a fire-extinguisher should be used.
- How to use a fire-extinguisher?

## Activity

Ask the participants to perform fire-extinguishing procedure with the help of a fire-extinguisher.

Skill Practice	Time	Resources
Operate Fire-extinguisher	1 Hour	Participant Handbook, Notepads, Pens, Fire-Extinguisher

## Notes for Facilitation

- Perform a skill practice activity on fire extinguisher.
- Demonstrate the utilisation of the fire extinguisher.

## 2.5.4: Operational Risk Control

### Say

The term Operational Risk Management (ORM) is defined as a continual cyclic process which includes risk assessment, risk decision making and implementation of risk controls, which results in acceptance, mitigation or avoidance of risk.

### Explain

- The steps in the operational risk control.
- The factors to be considered while evaluating the level of risk.

## Activity

Ask the participant to make a group of 5 to 6 members and discuss about the operational risk and its control.

Skill Practice	Time	Resources
Group Discussion	1 Hour	Participant Handbook, Notepads, Pens

## Notes for Facilitation

- Briefly explain the factors associated with risk to health while using hazardous substances.
- Give them a detailed explanation about the degree of exposure to the hazardous substances.

## Summary

In this module, the participants have learnt about:

- The lab layout and its equipment.
- The importance of personal hygiene and the do's and don'ts of the laboratory.
- The lab sanitation and appropriate arrangement of the reagents.
- The types of PPE used and their applications.
- The glassware cleaning process and the procedure to sterilise the equipment.
- The methods of handling toxic chemicals.
- The types of waste and their disposal methods.
- The first aid and its administration along with operational risk management.

## Exercise

**Briefly answer the following questions:**

1. What are the different equipment used in soil testing laboratory?

The soil testing lab consists of:

- soil sampling collecting equipment
- soil sample preparation equipment
- soil physical analysis equipment
- soil chemical analysis equipment
- storage or freezer room

2. What are the measures to be taken to ensure personal hygiene in the laboratories?

- Use of clean and tidy clothes.
- Utilisation of personal protective equipments inside the lab.
- Proper covering of wounds cuts and boils with adhesive bandages.
- Making use of scoops to transfer the chemicals.

3. Mention do's and don'ts in the laboratory.

Do's:

- Ensure personal safety at all the places of the lab.
- Recall the importance and results of the experiment before testing.
- Always store the chemicals in cool, dry and well ventilated places.

Don'ts:

- Eat, smoke and drink inside the lab.
- Experiment in unclean work-benches.
- Use of mobile phones.

4. What are different types of waste produced in soil testing lab?

- Toxic waste
- Broken glass
- Contaminated glass
- Sharps
- Radioactive waste

5. What are the glassware cleaning methods in soil testing lab?

- Cleaning before testing
- Cleaning after testing
- Cleaning of adhered residue











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## 3. Soil Physical and Chemical Analysis

Unit 3.1 – Soil sampling and its procedure

Unit 3.2 – Soil testing kit and its applications

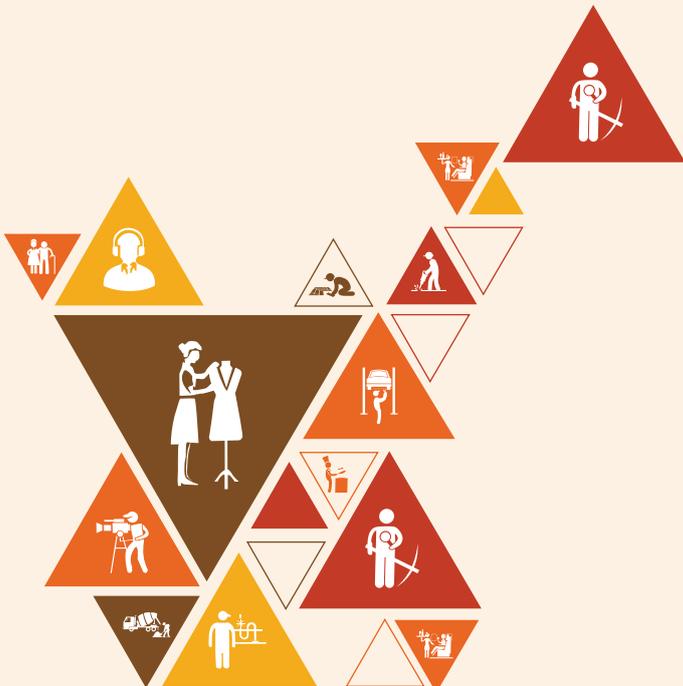
Unit 3.3 – Soil physical analysis

Unit 3.4 – Soil pH and EC determination

Unit 3.5 – Determination of micro and macro nutrients in soil

Unit 3.6 – Cation exchange capacity

Unit 3.7 – Reclamation of problematic soil



## Key Learning Outcomes



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

- Explain the soil sampling procedure.
- Analyse the physical parameters of the soil.
- Determine the chemical properties of the soil.
- Determine the micro and macro nutrients in the soil.

## Resources to be Used



- Flipchart / Whiteboard
- Marker
- Computer and projector
- Audio-visual aids
- Soil pH meter
- Soil moisture meter.
- Soil salinity meter
- Flame photometer
- Spectrophotometer

## Time Line



**Total time needed for facilitation - 80:00 Hours**

- Theory Duration - 20:00 Hours
- Practical Duration - 60:00 Hours

## Unit 3.1: Soil Sampling and its Procedure

### Unit Objectives

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

- Explain the soil sampling procedure.

### 3.1.1: Soil Sampling

#### Say

A soil test commonly refers to the analysis of a soil sample to determine its nutrient content, composition, and other characteristics such as the acidity or pH level.

#### Explain

The following topics:

- Soil sampling procedure.
- Soil sampling tools.
- Method of soil sample preparation.

#### Demonstrate

The soil sampling tools and explain their uses.

#### Elaborate

##### Soil Sampling Procedure:

- Have a critical look at the desired field for sample selection. Outline or demarcate the areas with similar soil colour, texture, topography and cropping pattern.
- Sample each of the marked area separately.
- Make a V- Shaped cut up to plough depth of 15 cm after removing litter around the surface. Auger may be used in case of hard soil. Take thick slices of soil of exposed face of the 'V' shaped cut.

## Notes for Facilitation

- Perform a skill practice activity on soil sampling procedure.
- Demonstrate the utilisation of the soil sampling tools.
- Brief the precautions to be taken while performing soil sampling procedure.
- Explain the method of preparation of soil samples for the analysis.

## Unit 3.2: Soil Testing Kit and its Applications

### Unit Objectives

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

- Make use of Soil Testing kit.

### 3.2.1: Soil Testing Kit

#### Say

Soil testing kits include an information sheet, a questionnaire, and a mailing bag/envelope. The information sheet provided with the soil testing kit describes proper sampling procedure. Along with information sheet, the kit also contains the sampling equipment such as Hand auger, Stainless steel sample tubes and Probes etc.

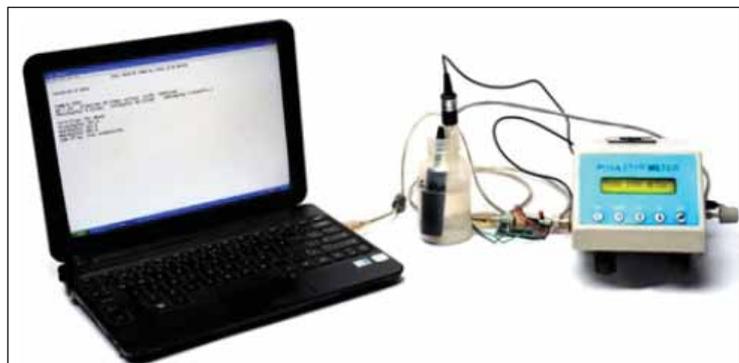
#### Explain

- The components of soil testing kit.
- The applications of soil testing kit.
- PUSA STFR Meter and its uses.

#### Elaborate

PUSA STFR Meter can test 12 parameters of soil, which are as follows:

- Available Organic Carbon (OC)
- Nitrogen (by Calculation) (N)
- Available Phosphorous (P)
- Available Potassium (K)
- Available Zinc (Zn)
- Available Sulphur (S)
- Available Boron (B)
- Available Iron (Fe)
- Available Manganese (Mn)
- Electrical Conductivity
- pH
- Lime Requirement Test For Acid Soil
- Gypsum Requirement Test For Alkaline Soil



*PUSA STFR Meter*

## Unit 3.3: Soil Physical Analysis

### Unit Objectives

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

- Identify the texture of the soil.
- Estimate the soil moisture percentage.
- Determine the bulk density of the soil.
- Analyse the sample and determine the moisture content and hydraulic conductivity.

### 3.3.1: Soil Texture Determination

#### Say

Soil texture is the relative proportion of sand, silt, and clay in a soil. Texture is considered as the prominent characteristic of the soil; very often the climatic conditions can alter the texture of the soil.

Soil texture determines its porosity which indirectly affects the root growth of the soil, as the porosity is factor which decides the nutrient supply and the water supply to the roots.

#### Explain

- Why it is important to determine a soil texture.
- The procedure for the texture determination by International Pipette Method.

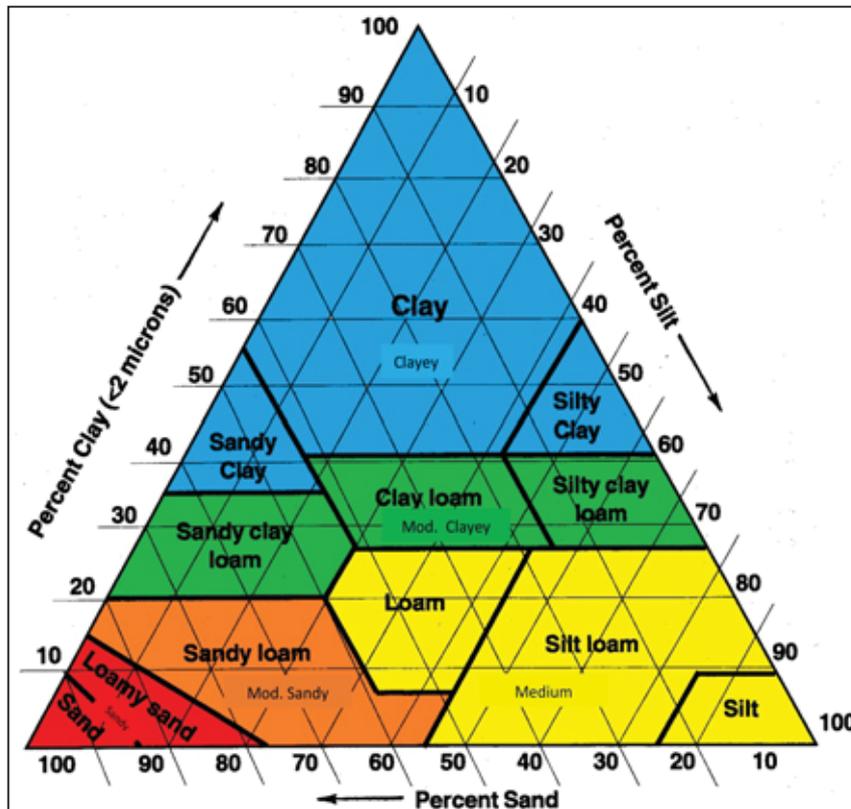
#### Elaborate

Soil texture is the relative proportion of sand, silt, and clay in a soil. Texture is considered as the prominent characteristic of the soil; very often the climatic conditions can alter the texture of the soil.

Soil texture determines its porosity which indirectly affects the root growth of the soil, as the porosity is factor which decides the nutrient supply and the water supply to the roots.

Soil texture can be determined by the 'International Pipette Analysis' (Mechanical Analysis).

- Calculate the percentage of the clay, silt and sand by the following formula:
  - $\% \text{ clay} = (\text{mass of soil} \times \text{mass of clay in aliquot} / \text{total mass of soil}) \times 100 \%$
  - $\% \text{ silt} = (\text{mass of soil} \times [\text{mass of silt} + \text{clay} - \text{mass of clay}] / \text{total mass of soil}) \times 100\%$
  - $\% \text{ sand} = 100 \% - (\% \text{ silt} + \% \text{ clay})$
- Use the textural triangle to assign a textural class name.



## Practical

Collect samples of soil and calculate the percentage of the clay, silt and sand by the following formula:

- $\% \text{ clay} = (\text{mass of soil} \times \text{mass of clay in aliquot} / \text{total mass of soil}) \times 100 \%$
- $\% \text{ silt} = (\text{mass of soil} \times [\text{mass of silt} + \text{clay} - \text{mass of clay}] / \text{total mass of soil}) \times 100\%$
- $\% \text{ sand} = 100 \% - (\% \text{ silt} + \% \text{ clay})$

## Demonstrate

The texture determination by International Pipette Method.

## Notes for Facilitation

- Begin with revising the topics explained in the previous session. Ask the following question:
  - What is meant by soil texture?
  - How does the soil texture affects the crop productivity?
- Encourage the participants to give their response.
- Clarify all the doubts of the participants.
- Refer the Fig 3.1.1 (a) for the soil texture analysis by the soil texture triangle.

## 3.3.2: Water Holding Capacity of Soil

### Explain

- soil moisture percentage
- dry weight of the soil

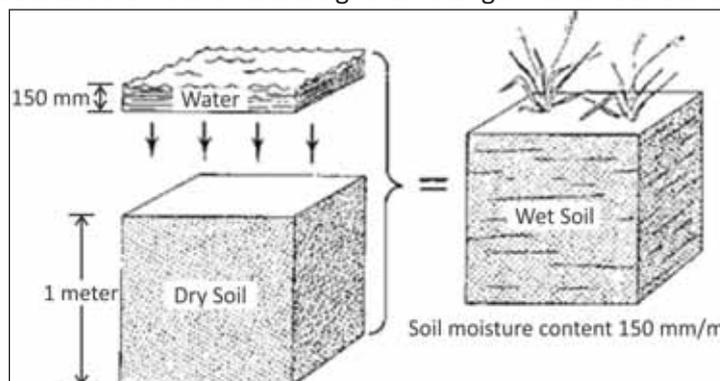
### Ask

- What is water holding capacity of the soil?
- How to calculate the percentage of moisture content in the soil?

### Elaborate

The soil moisture percentage/water holding capacity is indicated as the amount of the water present in the soil. In other words, soil moisture percentage is defined as the ratio of the content i.e., is the ratio of the mass of water in a sample to the mass of solids.

The dry weight of the soil particles within the sample is fixed and the moisture content is expressed in terms of dry mass because the moist or wet weight can change over time and with the climate.



## Practical

Calculate the soil moisture percentage for the given sample using the formula given below:

$$\% \text{ moisture content (MC)} = \frac{\text{Weight of moist soil (M)} - \text{Weight of dry soil (D)}}{\text{Weight of dry soil (D)}}$$

## Notes for Facilitation

- Enlighten the participants about the importance soil water holding capacity.
- Refer Fig 3.1.2 on page 47 in the Participant Handbook and explain the soil moisture level.

### 3.3.3: Methods of Bulk Density Determination

#### Say

Bulk density is an indicator of soil compaction. It is calculated as the dry weight of soil divided by its volume.

#### Explain

- What is bulk density?
- The methods of calculating the bulk density.

#### Practical

1. Calculate the bulk density using weighing bottle method.

$$G = \frac{M_2 - M_1}{(M_2 - M_1) - (M_3 - M_4)}$$

2. Calculate the bulk density using the clod method.

$$\text{Bulk density (Mg/m}^3\text{)} = \frac{D_w \times DW_s}{W_s - W_{sp} + W_p - (W_p \times D_w / D_p)}$$

3. Calculate the bulk density using the core method.

$$\rho = \frac{\gamma}{1 + w} = \frac{(M / V)}{1 + w}$$

#### Ask

The participants to calculate the bulk density using

- Weighing Bottle Method
- Clod method
- Core Method

#### Notes for Facilitation

- Ensure that all the participants are able to calculate the bulk density.
- Brief them on the importance of calculating the bulk density.

### 3.3.4: Hydraulic Conductivity

#### Say

Hydraulic conductivity is defined as the ease with which pores of a saturated soil permit water movement.

#### Explain

The following topics:

- Constant-head method.
- Falling head method.

#### Practical

Calculate the soil moisture percentage with:

a) Constant-head method

$$\frac{QL}{Aht}$$

b) Falling head method

$$K = \frac{2.3al}{At} \log \left( \frac{h_1}{h_2} \right)$$

#### Notes for Facilitation

- Make sure that the participants understand the importance of knowing the moisture percentage in soil.
- Ensure that all the participants are able to calculate the soil moisture percentage.

### 3.3.5: Moisture Content Determination

#### Explain

- The need to determine the moisture content in the soil.
- The method to determine the moisture content of the collected sample.

## Elaborate

**The methods of determining the moisture content are given below:**

### 1. Gravimetric Method

The procedure to determine the soil moisture percentage is as follows:

1. Weigh both of the aluminum dishes.
2. Aliquot approximately 50 g of moist soil into each aluminum dish and reweigh the dishes. Hence, the moist weight of the soil sample is now known.
3. Dry the soil overnight at 105 °C in the oven.
4. Remove the dishes from the oven and allow them to cool.
5. Reweigh the dishes plus the oven dry soil. Now the weight of the dry soil is known.
6. Calculate the soil moisture content for each of the replicate samples using the formula.

$$\% \text{ moisture content (MC)} = \frac{\text{Weight of moist soil (M)} - \text{Weight of dry soil (D)}}{\text{Weight of dry soil (D)}}$$

### 2. Infrared moisture meter method.

Infrared moisture meter contains the infrared lamp, energy regulator for adjusting the intensity of the lamp, lock, sample holder, thermometer and scales for adjusting the percentage.

Procedure:

1. Adjust the measuring scales of the percentage indicator and the temperature to zero
2. Remove the lock and the place the sample on the sample holder.
3. Close the chamber containing the lamp and the specimen.
4. Note the initial temperature and increase the intensity of lamp by energy regulator to 6 or 7 readings.
5. After the 10 to 15 Minutes the moisture evaporated and the temperature is recorded in the indicator.
6. The amount of moisture evaporated is indicated in the indicator.

## Practical

- Take the participants to the lab.
- Show them infrared moisture meter and explain its operation.

## Demonstrate

How to determine the moisture content of the soil sample.

## Activity

Divide the participants into groups and ask them to determine the moisture content using:

1. Gravimetric Method
2. Infrared moisture meter method

## Unit 3.4: Soil pH and EC Determination

### Unit Objectives

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

- Estimate the pH of the soil.
- Determine the EC of the soil.

### 3.4.1: pH Determination

#### Explain

- What is meant by pH?
- How to determine the pH?

#### Activity

- Ask the participants to make a group of 5 to 6 members each.
- Give them a task for preparing charts on the pH requirement of soil for different crops.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Notepads, Pens

#### Notes for Facilitation

- Brief the participants on the importance of determining the pH.
- Explain the principle of potentiometric method.
- Familiarise the participants with electrical conductivity meter and its uses.
- Demonstrate the working of electric conductivity meter.

### 3.4.2: Electrical Conductivity of Soil

#### Say



Electrical conductivity (EC) is a measurement that correlates with soil properties that affect crop productivity, including soil texture, cation exchange capacity (CEC), drainage conditions, organic matter level, salinity and subsoil characteristics.

#### Explain



- The principle to be followed for EC determination.
- The apparatus and reagents required to determine the EC.

#### Elaborate



The procedure to be followed to determine the EC:

1. Prepare a 1:5 of soil:water suspension by weighing 10 g air-dry soil (<2 mm) into a bottle.
2. Add 50 mL de-ionised water. Mechanically shake at 15 rpm for 1 hour to dissolve soluble salts.
3. Calibrate the conductivity meter according to the manufacturer's instructions using the KCl reference solution to obtain the cell constant.
4. Rinse the cell thoroughly. Measure the electrical conductivity of the 0.01M KCl at the same temperature as the soil suspensions.
5. Rinse the conductivity cell with the soil suspension. Refill the conductivity cell without disturbing the settled soil.
6. Record the value indicated on the conductivity meter. Rinse the cell with de-ionised water between samples.

#### Demonstrate



The method to determine the EC.

#### Notes for Facilitation



- Familiarise the participants with electrical conductivity meter and its uses.
- Demonstrate the working of electric conductivity meter.

## Unit 3.5: Determination Macro and Micronutrient in Soil

### Unit Objectives

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

- Determine the amount of organic carbon and  $\text{CaCO}_3$ .
- Estimate the macro and micro nutrients in the soil.

### 3.5.1: Soil Amendments

#### Say

Soil amendment comprises of all organic and inorganic materials mixed in the soil for attaining a better constitution of the soil related to the productivity of plants. Soil amendments do not include mulching that includes matter lying on top of the soil.

#### Explain

The determination of the organic carbon by:

- Walkley and Black Method
- UV spectrophotometer method

The determination of the calcium carbonate by:

- Acid Neutralisation Method
- Schrotus Apparatus Method

#### Demonstrate

The method to determine the organic carbon

- Walkley & Black Method

$$\text{C in soil (\%)} = [(B-T) \times S \times 0.003 \times 1.3 \times 100] \div W$$

- UV spectrophotometer method

$$\text{Organic Carbon \%} = \text{Optical density} \times \text{Factor}$$

## Demonstrate

The method to determine the calcium carbonate by.

- Acid neutralisation method

$$\text{CaCO}_3\% \text{ in soil} = \frac{5(\text{Blank} - T)}{W} \times F$$

- Schrotus Apparatus Method

$$\text{Wt. of CO}_2\text{lost} = (\text{Initial wt. of flask + acid + soil}) - (\text{Final wt. of flask + acid + soil})$$

## Notes for Facilitation

- Ensure that all the participants know how to determine the organic carbon and  $\text{CaCO}_3$ .
- Make the participants to perform the calculations.
- Brief them on the importance of soil amendments.

## 3.5.2: Soil Macro Nutrients

### Say

The macronutrients of the soil include nitrogen, potassium and phosphorus. The determination method of macronutrients is very vital because the amount of the micronutrient present directly affects the yield of the crops.

### Explain

- The determination of nitrogen by alkaline permanganate method.
- The determination of phosphorus by Olsen's Method.
- The determination of potassium by flame photometer method.

**Demonstrate**

The method to determine the nitrogen by alkaline permanganate method.

$$N\% = \frac{(A - B) \times \text{Normality of } H_2SO_4 \times 0.014 \times 100 \text{ g}}{\text{Wt. of soil (g)}}$$

The method to determine phosphorus by Olsen's Method.

$$P \text{ (ppm)} = \frac{GR \times 50 \times 5}{\text{Corrected Ht. Of Soil}}$$

The method to determine potassium by flame photometer method.

$$K \text{ (ppm)} = \text{Reading from graph g K / ml in extract (R)} \times 5 \times \text{Dilution Factor (Df)}$$

**Practical**

Call upon the participants and show them how to determine the macronutrients in the lab.

**Notes for Facilitation**

- Brief the participants about the importance of macronutrients in soil.
- Ensure that all the participants understand the methods of determination of macronutrients.
- Make sure that all the participants perform the calculations to determine the macronutrients.

**3.5.3: Soil Micro Nutrients****Say**

The micronutrients of the soil include sodium, calcium, magnesium, boron and zinc, etc. It is very important to know the determination methods of micronutrients, because they add to the property of the soil.

## Explain



- The determination of sodium by flame photometer method.
- The determination of calcium and magnesium by EDTA. titrimetric method.
- The determination of boron by hot water method, dilute hydrochloric acid method.
- The determination of sulphur by precipitation method, turbidimetric method.
- The determination of zinc, copper, iron, manganese by DTPA method.

## Elaborate



- The method to determine the sodium by flame photometer method.

$$\text{Na (ppm)} = \frac{\text{GR} \times \text{Vol. of extractant}}{\text{Corrected wt. of the soil}} \times \text{Dilution}$$

- The method to determine calcium and magnesium by E.D.T.A. titrimetric method.

$$\text{mEq (Ca + Mg) or Ca/100 gm} = \frac{\text{ml. of EDTA required} \times \text{Normality of EDTA (0.01)} \times \text{vol. made 100 ml} \times 100}{\text{sample taken for titration (ml)} \times \text{Weight of soil in gm.}}$$

$$\text{mEq (Mg)} = \text{mEq (Ca + Mg)} - \text{Meq (Ca)}$$

- The method to determine boron by hot water method, dilute hydrochloric acid method.

$$\text{Soil B} = \text{extract-B(mg/L)} \times 2$$

- The method to determine sulphur by precipitation method, turbidimetric method.

$$\text{Mg SO}_4^{-2/l} = \frac{\text{Mg SO}_4^{-2} \times 1,000}{\text{ML Sample}}$$

- The method to determine zinc, copper, iron, manganese by DTPA method.

$$\text{Concentration in ppm} = \text{reading} \times \text{dilution} \times \text{factor} \times \frac{100}{\text{D.w.at } 105^\circ\text{C}}$$

## Practical

- Conduct flame photometer method and determine sodium.
- Conduct EDTA titrimetric method to determine calcium and magnesium.
- Determine boron by hot water method.
- Demonstrate the methods to determine the sulphur.
- Demonstrate the DTPA method.

## Notes for Facilitation

- Make all the participants to perform all the methods of determination of micronutrients.
- Give them an explanation on the significance of micronutrients in the soil.
- Make sure that the participants are able to distinguish between micro and macrinutrients.

## Unit 3.6: Cation Exchange Capacity and Soil Testing Kit

### Unit Objectives

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

- Determine the soil cation exchange capacity.

### 3.6.1: Cation Exchange Capacity of the Soil

#### Say

Cation Exchange Capacity (CEC) is the total capacity of a soil to hold exchangeable cations. It is the inherited property of the soil that helps it to hold the essential nutrients in the soil.

#### Explain

The methods for the determination of cation exchange capacity:

- Ammonium saturation method.
- Sodium saturation method.

#### Elaborate

1. The procedure for ammonium saturation method.

Calculation:

$$\text{Cation Exchange Capacity} = \frac{\text{NTV} \times 100}{10 D} \text{ Meq/100 gm of soil.}$$

Where,

D = The weight of oven dry soil in the weight of air dry soil taken for analysis.

V = The total volume of the final solution containing the ammonium ion.

T = The volume of standard acid (0.02N) used for titrating the ammonia nitrogen after correction for the blank.

N = Normality of standard acid 0.02N.

## Elaborate

2. The procedure for sodium saturation method.

Calculations:

$$\text{Meq of Na / litre in CEC extract} = \text{ppm Na in CEC undiluted extract} / \text{Eq. Wt. of Na}$$

$$\text{Meq of Na / 100 gm of soil} = \frac{\text{Meq of Na / litre in CEC extract} \times 100}{10 \times \text{Soil in gm taken for preparation of CEC extract}}$$

$$\text{CEC of Soil} = \text{meq of Na / 100 gm soil}$$

## Demonstrate

The methods for the determination of cation exchange capacity of soil.

## Practical

- Take the participants to the lab.
- Collect the samples of soil.
- Ask the participants to determine the cation exchange capacity of the collected sample of the soil.

## Ask

- What is meant by the cation exchange capacity of the soil?
- What are the different methods of determining the cation exchange capacity of the soil?

## Notes for Facilitation

- Brief the participants on the importance of knowing the cation exchange capacity of the soil.
- Ensure that all the participants are able to determine the cation exchange capacity of the soil.
- Clarify all the doubts of the participants.

## Unit 3.7: Reclamation of Problematic Soil

### Unit Objectives

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

- Outline the gypsum requirement for the problematic soil.
- Identify the procedures to be followed for the restoration of the problematic soil.

### 3.7.1: Restoration of Problematic Soil with Gypsum

#### Say

A soil reclamation system that separates the contaminant from all soil particles greater than one micron in diameter and generates reusable soil and contaminant products.

#### Explain

- Importance of reclamation of soil.
- The procedure for restoration of soil.

#### Elaborate

Calculation:

$$\text{Ca or Ca+Mg (me/L) in the aliquot} = 2V$$

Where, V stands for volume of versenate solution used.

Since, 1 litre extract = 50 g soil (5 g soil to 100 ml)

$$\text{Ca retained (or Ca requirement) in me/100 g soil} = [2V \text{ for added gypsum solution} - 2V \text{ for filtrate}] \times 2 \dots (A)$$

$$\text{Gypsum requirement of soil in tons per hectare} = A \times 3.852 \text{ upto 30 cm soil depth}$$

#### Do

Perform the procedure for reclamation of soil in the lab. Ask the participants to make a note of the observations made.

## Notes for Facilitation

- Ask questions about the restoration of soil.
- Tell them the importance of the gypsum requirement for the soil.
- Clarify all the doubts of the participants.

## Summary

In this chapter, the participants have learnt about:

- The various procedures followed in soil physical analysis.
- The method to determine the pH and electrical conductivity of the soil.
- The importance of macro and micronutrients in the soil.
- The various methods to determine the macro and micronutrients in the soil.
- The importance of soil testing kit and its importance.
- The procedure for determination of cation exchange capacity.
- The procedure for the restoration of the problematic soil.

## Exercise

**Briefly answer the following questions:**

1. Describe the principle used in potentiometric method for determination of pH level in the soil.

Principle of potentiometric method is essentially based on the measurement of potential, developed across an indicator or the glass electrode on account of the difference activity of H<sup>+</sup> ions in and out of the electrode, i.e., in the bathing solution. The potential difference between the glass electrode and calomel electrode is expressed in pH units.

2. Name the macro and micro nutrients present in the soil.

Macro nutrient	Micro nutrients
Nitrogen	Sodium
Potassium	Calcium
Phosphorous	Magnesium
	Boron
	Sulphur

3. Define soil cation exchange capacity of the soil.

Cation exchange capacity (CEC) is the total capacity of a soil to hold exchangeable cations. It is the inherited property of the soil that helps the soil to hold the essential nutrients in the soil.

4. What is the importance of soil testing kit?

- Soil testing kit helps us to prepare the samples.
- Soil testing kit gets the instant access about the pH, texture and temperature of the soil.
- Soil testing kit creates the awareness about the cultivator about the health of the soil and the inspection.







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Transforming the skill landscape

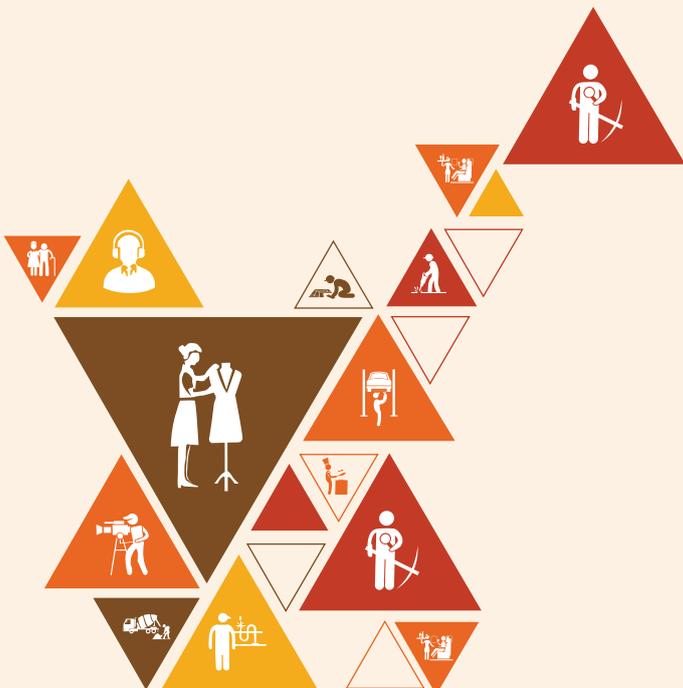


## 4. Water Analysis

Unit 4.1 – Determination of Water pH and EC

Unit 4.2 – Determination of Water Soluble Salts

Unit 4.3 – Determination of Dissolved Chemicals in Water



## Key Learning Outcomes



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

- Determine the water pH and water EC.
- Estimate the total dissolved and suspended salts in water.
- Determine the percentage of soluble chemicals in the water.

## Resources to be Used



- Flipchart/Whiteboard
- Marker
- Laptop
- Audio-visual aids
- Projector
- Water hardness meter
- COD Analyser
- Photo colorimeter
- TDS meter.
- Flame photometer
- Spectrophotometer

## Time Line



**Total time needed for facilitation - 25:00 Hours**

- Theory Duration - 05:00 Hours
- Practical Duration - 20:00 Hours

## Unit 4.1: Determination of Water pH and EC

### Unit Objectives

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

- Determine the water pH and water EC.
- Estimate electrical conductivity.

### 4.1.1: Water pH

#### Explain

- The importance of determination of pH.
- The method of determination of pH in water.

#### Practical

- Take small amount of water as a sample.
- Determine the pH level of the sample.
- Note down the results.
- Ask all the participants to determine the pH level in water.

#### Notes for Facilitation

- Conduct the determination test on different samples.
- Ask the participants to note the difference in the pH level of different samples.
- Refer the table on page 79 in the Participant Handbook and explain the ranges of water pH.

## 4.1.2: Electrical Conductivity of Water

### Say

EC or Electrical Conductivity of water is its ability to conduct an electric current. Salts or other chemicals that dissolve in water can break down into positively and negatively charged ions.

### Explain

- The principle to be followed for EC determination.
- The apparatus and reagents required to determine the EC.

### Elaborate

The procedure for calculating the electrical conductivity of water.

- Calibrate the conductivity cell with the help of standard KCl solution and determine the cell constant.
- Dip the conductivity cell assembly in water sample taken in a 50 or 100 ml beaker and record the conductivity. If the value is too low, change the adjustment accordingly. Record the temperature of water during the test.
- Observed values of EC are multiplied by the cell constant (usually given on conductivity cell) and a temperature factor to express results at 25°C.
- Remove the cell from soil suspension, clean with distilled water and dip into a beaker of distilled water. EC is expressed as dS/m.
- Keep the conductivity cell in distilled water when not in use.

$$\text{Cell constant (K)} = \frac{\text{Known conductivity of 0.01 N KCl}}{\text{KCL Conductivity of 0.01 N KCl}}$$

### Activity

- Take the participants to the lab.
- Demonstrate the procedure for calculating the EC of water.
- Ask the participants to perform as per the demo.

Skill Practice	Time	Resources
Operating the Lab Equipment	1 Hour	Participant Handbook, Notepads, Pens, Lab apparatus and Equipment.

## UNIT 4.2: Determination of Water Soluble Salts

### Unit Objectives

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

- Determine the Total Dissolved Solids (TDS) in water.
- Determine the Total Suspended Solids (TSS) in water.

### 4.2.1: Total Dissolved Solids

#### Explain

- The procedure involved in the determination of the TDS.
- The apparatus used in the determination of the TDS.

#### Activity

Show some videos or charts about the importance of determining the TDS of water.

Skill Practice	Time	Resources
Video Demo	15 Minutes	Audio-video Projection System

#### Practical

- Take the participants to the lab.
- Demonstrate the apparatus used in determination of TDS.
- Take a sample of water solution.
- Determine the TDS in the sample.

#### Notes for Facilitation

- Ensure that all the participants determine the TDS.
- Brief them on the importance of following the procedure for the determination.
- Check that all the participants calculate the TDS using the formula.

## 4.2.2: Total Suspended Solids

### Ask



- What is meant by Total Suspended Solids (TSS)?
- How to determine the TSS?

### Explain



- The procedure involved in the determination of the TSS.
- The apparatus used in the determination of the TSS.

### Activity



- Show some videos or charts about the importance of determining the TSS of water.

Skill Practice	Time	Resources
Video Demo	15 Minutes	Audio-video Projection System

### Practical



- Take the participants to the lab.
- Demonstrate the apparatus used in determination of TSS.
- Take a sample of water solution.
- Determine the TSS in the sample.

### Notes for Facilitation



- Ensure that all the participants determine the TSS.
- Brief them on the importance of following the procedure for the determination.
- Check that all the participants calculate the TSS using the formula.

## Unit 4.3: Determination of Dissolved Chemicals in Water

### Unit Objectives

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

- Use different methods to determine carbonates/bicarbonates and mineral elements in the water
- Determine the amount of the chemicals dissolved in water.

### 4.3.1: Carbonates and Bicarbonates

#### Say

The carbon dioxide that is dissolved by naturally circulating waters appears in chemical analysis principally as bicarbonate and carbonate ions.

#### Explain

- The procedure of determining the carbonates and bi-carbonates..
- The effects caused by the carbonates and bi-carbonates present in the water used for irrigation.

#### Do

Visit a soil and water testing lab along with the participants to have a better understanding of effects caused by the carbonates and bi-carbonates present in the irrigation water.

#### Demonstrate

The method to determine the carbonates and bi-carbonates by:

$$\text{Carbonates (milliequivalents / litre) CO}_3^{-2}(\text{me/L}) = \frac{2 (Y - B) \times \text{Normality of H}_2\text{SO}_4 \times 1000}{\text{Sample in ml.}}$$

$$\text{Bicarbonates (milliequivalents / litre) HCO}_3^{-2} (\text{me/L}) = \frac{(Z - B) - 2 (Y - B) \times \text{Normality of H}_2\text{SO}_4 \times 1000}{\text{Sample in ml.}1000}$$

## Notes for Facilitation

- Give a sample to the participants and ask them to determine the carbonates and bicarbonates in it.
- Ensure that all the participants use the formula correctly and acquire accurate results.

## 4.3.2: Dissolved Minerals and Elements in Water

### Explain

- The principle to be followed for Calcium and Magnesium determination by EDTA method.
- The procedure to be followed for the determination of the Sodium by Flame Photometer method.
- The principle to be followed for potassium determination.
- The procedure to be followed for potassium determination.
- The principle to be followed for nitrogen determination.
- The analysis of water for determination of boron and Chloride.
- The principle to be followed for Sulphate determination by spectrophotometer.

### Practical

Call upon the participants and show them chemical analysis of water in laboratory.

### Demonstrate

The method to determine the Calcium and Magnesium by EDTA method.

$$\text{Ca}^{2+} + \text{Mg}^{2+} \text{ milli equivalents per litre (mE/L) of water} = \frac{\text{MI of EDTA} \times \text{Normality of EDTA} \times 1000}{\text{Water sample (ml)}1000}$$

$$\text{Ca}^{2+} \text{ (mE/L)} = \frac{\text{MI of EDTA} \times \text{Normality of EDTA} \times 1000}{\text{Water sample (ml)}}$$

$$\text{Mg}^{2+} \text{ (mE/L)} = \text{mE / L (Ca}^{2+} + \text{Mg}^{2+}) - \text{me / L (Ca}^{2+})$$

## Demonstrate

The method to determine sodium on flame photometer method.

$$\text{SAR} = \frac{\text{Na}}{\sqrt{\frac{\text{Ca}^{++} + \text{Mg}^{++}}{2}}}$$

The method to determine Pottasium.

$$\text{K (ppm)} = \text{Reading from graph g K / ml in extract (R)} \times 5 \times \text{Dilution Factor (Df)}$$

$$\begin{aligned} \text{K (kg/ha)} &= \text{R} \times (25/5) \times (1000/1) \times (1/1000) \times (1/1000) \times (1/1000) \times (2240000/1) \\ &= \text{R} \times 5 \times 2.24 \times \text{Dilution Factor (Df)} \end{aligned}$$

$$\text{K}_2\text{O+(kg/ha)} = \text{R} \times 11.20 \times 1.2$$

To covert K<sub>2</sub>O to K multiply by 0.83.

The method to determine phosphorus by. Vanadomolybdophosphoric Acid Method.

The method to determine nitrogen by UV-spectrometer method.

The method to determine boron by hot water method.

The method to determine chloride by .

$$\text{Chloride (meq/lit.)} = \frac{(V - B) \times N \times 1000}{\text{sample (ml)}}$$

The method to determine sulphate on spectrophotometer.

$$\text{SO}_4^{--} = \frac{\text{GR} \times 25}{\text{sample (ml)}}$$

## Activity

- Show some videos on water analysis.
- Make a chart about the different chemicals that are present in water and their effects on cultivation.

Skill Practice	Time	Resources
Video Demo	15 Minutes	Audio-video Projection System
Chart Making	45 Minutes	Participant Handbook, Notepads and pens

## Notes for Facilitation

- Briefly explain the importance determining the elements and minerals in water.
- Give them a detailed explanation for all the procedures of determining the minerals and elements.

## Summary

In this chapter, the participants have learnt about:

- The apparatus and process used for the determination pH and EC of water.
- The procedure to be followed to determine the total dissolved and suspended solids in water.
- The determination of carbonates and bicarbonates from water.
- The process for determining the elements and minerals dissolved in water.

## Exercise

**Briefly answer the following questions:**

1. Define pH and electrical conductivity of the water.

pH stands for potential of hydrogen. pH is a measurement of hydrogen ion concentration in an aqueous solution.

The ability of the water to conduct electricity is known as electrical conductivity of water.

2. List the various dissolved solids present in water.

- Magnesium
- Carbonates & Bi-carbonates
- Sodium
- Nitrogen
- Phosphate
- Potassium
- Boron
- Chloride
- Sulphate

3. Mention the different sources of nitrogen.

- Fertilisers and manure.
- Decayed vegetable.
- Animal feedlots.
- Municipal wastewater and sludge disposal to land.
- Industrial discharges.
- Leachates from refuse dumps.
- Septic systems.
- N-fixation from atmosphere by bacteria and lightning.









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Transforming the skill landscape



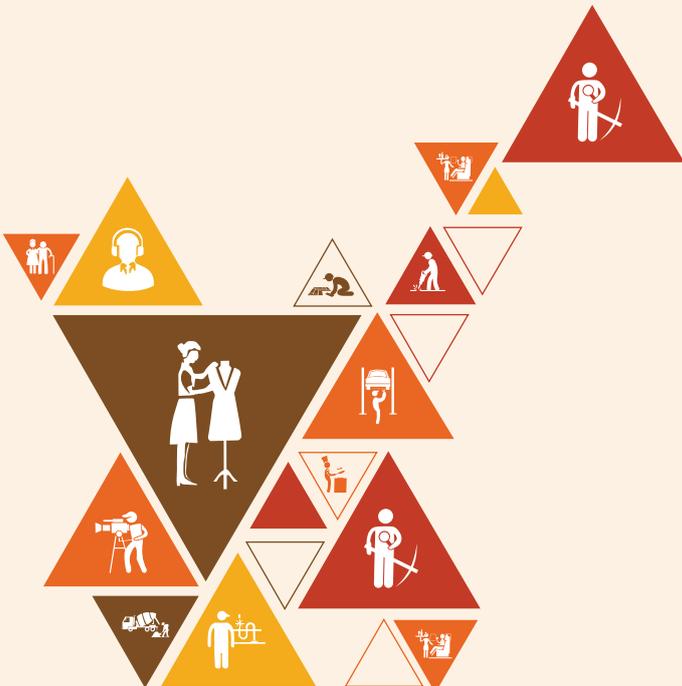
## 5. Soil Health Card

Unit 5.1 – Essential Nutrients and their Analysis

Unit 5.2 – Management of Fertiliser and Micro Nutrients

Unit 5.3 – Soil Amendment and Integrated Nutrient  
Management

Unit 5.4 – Soil Health Card Portal Management



## Key Learning Outcomes



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

- Determine the quantity of nutrients required for soil analysis.
- Explain the phases of nutrients consumption.
- Identify and explain the nutrients required for soil fertilizer management.
- Outline the factors that are considered while applying the doses of fertiliser and micronutrients.
- Explain about the fertilisers and micronutrients recommendation.
- Outline the importance of manure crops.
- Discuss about the amendments required to raise the soil reaction.
- Outline the integrated nutrient management practices.
- Explain soil health card and its benefits.
- Prepare the soil fertility map by utilising GIS.

## Resources to be Used



- White/black board
- Pen and Chart paper
- Markers
- Laptop
- Projector
- Calculator
- Audio-visual aids

## Time Line



**Total time needed for facilitation - 30 Hours.**

- Theory Duration - 10:00 Hours.
- Practical Duration - 20:00 Hours.

## UNIT 5.1: Essential Nutrients and their Analysis

### Unit Objectives

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

- Determine the quantity of nutrients required for soil analysis.
- Outline the preparation and standardisation of reagent solutions.
- Explain the phases of the nutrients consumption in plants.
- Explain soil fertility and its importance.

### 5.1.1: Determining the Quantity of Elements

#### Say

Soil analysis is a set of various chemical processes that determine the amount of available plant nutrients in the soil, but also the chemical, physical and biological soil properties important for plant nutrition or soil health.

#### Explain

- The list of nutrients which are to be determined in a soil.
- The procedure to determine the quantity of nitrogen and phosphorous nutrients.

#### Elaborate

Nitrite ions react with sulfanilic acid (in an acidic medium contained in the NitraVer 5 powder) to form an intermediate diazonium salt. When coupled with gentisic acid (also contained in the NitraVer 5), an amber-colored solution is formed.

Colour intensity of this compound is directly proportional to the nitrate concentration of the water sample and it can be quantified by using the nitrate color comparator box with a continuous nitrate amber color disk.

For phosphorus, sodium molybdate and potassium pyrosulfate in the purchased PhosVer 3 reagent powder react with the soluble reactive phosphates to form a phospho-molybdate complex.



## Elaborate

The complex is then reduced by ascorbic acid (also contained in PhosVer 3 powder) to form a molybdenum blue colour.

The blue color is quantified using a phosphate color comparator box with a continuous phosphate blue color disk.

Generally the quantity of the nutrients is measured in “ppm or mg/kg”.

## Practical

- Take the participants to the lab.
- Demonstrate the procedure for determining the quantity of nitrogen and phosphorous nutrients.
- Ask the participants to perform the procedure as per the demo.

## Notes for Facilitation

- Brief the participants on what is soil analysis.
- List the basic plant nutrients which can be determined by chemical soil analysis.
- Demonstrate the colour comparator kit, its components and their uses.

## 5.1.2: Molarity and Normality

### Say

Molarity and normality are the units for concentration. Molarity means, number of moles of solute per liter of solution; normality is number of mole equivalents per liter of solution.

## Notes for Facilitation

- Briefly explain the participants on the importance of knowing the molarity and normality of the solution.
- Ensure that all the participants understand what is molarity and normality.

### 5.1.3: Interpretation of Result and Nutrients Consumption

#### Say

Interpretations of soil tests vary because of the method used to develop the test (soil test correlation and calibration) and the philosophy for nutrient management.

#### Explain

The following topics:

- The interpretation of the result.
- The units and measurements.
- The phases of nutrient consumption.

#### Elaborate

##### Phases of Nutrients Consumption:

**Critical value or range** indicates the soil or tissue content below which the plant most likely is deficient in that specific nutrient and production could be enhanced by addition of the nutrient. Below that critical value, the nutrient levels are below optimum.

**Sufficiency or Optimum range** is the nutrient level at which the plant has enough nutrients to function and develop properly.

**Luxury consumption** occurs when soil nutrient levels are above optimum and plants take up more of a nutrient than needed for functioning and production. Potassium (K) is commonly taken up in excess.

**The toxicity level** is the nutrient level at which there is so much of a nutrient that it can harm the plants. This value will be reported as either a "high" or "very high" level on a soil test. Severe toxicity will result in death of plants.

#### Demonstrate

The curve of the stages of nutrient contents in a plant tissue.

#### Notes for Facilitation

Define what is toxicity level and explain its effect on the plants.

## 5.1.4: Soil pH and Conversion Factor

### Explain



The following topics:

- Soil pH
- Essential conversion factor

### Ask



- What is the importance of knowing the soil pH?
- What is the relationship between soil pH and nutrients availability?

### Elaborate



**Conversion factor:**

- Most laboratories express the soil sample nutrient measurement on the basis of the element itself (i.e., N, P, K etc.)
- In the case of phosphorus (P), potassium (K) and magnesium (Mg), the situation gets a little more complicated. Instead of expressing their nutrient contents as the uncombined elements, they are traditionally expressed as the oxides even though in most cases, the fertilisers do not contain oxides. Therefore:
  - P is measured as  $P_2O_5$
  - K is measured as  $K_2O$
  - Mg is measured as  $MgO$
- However, the units for fertilisers are expressed as %N-% $P_2O_5$ -% $K_2O$ .
- Calcium and magnesium tend to be expressed on an element basis (Ca and Mg) but are also sometimes expressed as oxides (CaO and MgO).

### Demonstrate



The soil pH scale and explain what is optimum pH range.

### Do



Explain the relationship between soil pH and nutrients availability.

## Notes for Facilitation

- Give a detailed explanation about the soil pH scale and its uses.
- Ensure that all the participants understand how to use a soil pH scale.
- Refer page 103 in the Participant Handbook and explain the soil pH scale of different nutrients.

## 5.1.5: Nutrients in Soil Fertility Management

### Say

Soil fertility is the capacity of a soil to supply plant nutrients in adequate amounts to facilitate optimum growth and obtain the yield potential of a crop.

### Explain

- Importance of soil fertility management
- Plant nutrients

### Activity

- Ask the participants to make a group of 5 to 6 members each group.
- Conduct a group discussion on the importance of soil fertility management.

Skill Practice	Time	Resources
Group Discussion	1 Hour	Participant Handbook, Notepads, Pens

## Notes for Facilitation

- Give a detailed explanation on the role of soil fertility.
- Brief the participants on what is nutrient deficiency and its effect on plant growth.

## 5.1.6: Classification of Plant Nutrients

### Say

Nutrients help the plant for seed germination and healthy root growth. Plants need nutrients to promote flowering, fruiting, and disease resistance.

### Explain

The classification for nutrients with the help of the following chart:

Major nutrients		Secondary Nutrients	Micronutrients
Group I	Group II		
Carbon(C) Hydrogen (H) Oxygen (O)	Nitrogen (N) Phosphorus (P) Potassium (K)	Calcium (Ca) Magnesium (Mg) Sulphur (S)	Iron (Fe) Manganese (Mn) Boron (B) Zinc (Zn) Copper (Cu) Molybdenum (Mo) Chlorine (Cl)

### Activity

Call upon some participants and divide them into groups and give a task of preparing charts on: Classification of nutrients.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

## Notes for Facilitation

- Ask what is the importance of macro and micronutrients in the soil.
- Give them a detailed explanation on the quantity and concentration of each macro and micronutrient.

## UNIT 5.2: Management of Fertilisers and Micronutrients

### Unit Objectives

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

- Discuss about the fertiliser, micro nutrients and their recommended doses.
- Explain the recommended factors for fertiliser and micro-nutrient doses.
- Outline the importance of manure crops.

### 5.2.1: Dosages of Fertilisers and Micronutrients

#### Explain

The following topics:

- Fertiliser
- Micro nutrients

#### Ask

- What do you understand by the term fertiliser?
- Important micro nutrients essential for plants.

#### Demonstrate

- The table to show the micronutrients and their recommended quantity for dosage.
- The table to show the fertilisers (NPK) recommendation.

#### Notes for Facilitation

- Ask the participants to refer page 108 and 109 in the Participant Handbook and study the fig 5.2.1 (a) and 5.2.1 (b).
- Explain the need to know the micronutrients and fertilisers recommendations.

## 5.2.2: Factors Affecting the Fertiliser Requirement

### Explain



The following topics:

- Fertiliser recommendations.
- Factors for recommending fertiliser and micronutrient dose.
- Management of the crop.

### Ask



- What is meant by fertiliser recommendations?
- What are the factors affecting the fertiliser selection?

### Notes for Facilitation



- Give a detailed explanation on the steps of application of fertilisers in solid form.
- Explain the need to know the fertiliser recommendations for a crop.

## 5.2.3: Manure Crops and their Uses

### Say



Manure is an excellent fertiliser which contains many nutrients. It adds organic matter to the soil to improve its structure, aeration, soil moisture-holding capacity and water infiltration.

### Explain



The following topics:

- Organic manure crops
- Green manure crops
- Importance of manure crops

## Elaborate

### Importance of manure crops:

- Provide soil cover for no-tillage (reduces water evaporation and soil temperature and increases water infiltration).
- Protect soil from erosion.
- Food produced is free from harmful chemicals.
- Easily bio-degradable and do not cause pollution.
- Cost effective, as it is prepared locally.
- Reduce weed infestation.
- Improve soil structure.
- Promote biological soil preparation.
- Increase economic return (when adequately chosen).
- Use of herbicides and pesticides are minimized.
- Increase yield and improve quality of the following crops.
- Prevent soil erosion.
- Conserve soil humidity.
- Maintain or increase soil organic matter content.
- Provide nitrogen to the soil.
- Improve soil fertility.
- Reduce fertilisation costs.

## Activity

Call upon the participants, divide them into group and give a task of preparing charts on:  
Types of manure and their properties.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

## Notes for Facilitation

- Encourage the participants by prompting them with questions.
- Enlighten the participants by showing videos which will promote them to understand the importance of the manure.

## UNIT 5.3: Soil Amendment and Integrated Nutrient Management

### Unit Objectives

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

- Explain lime amendment and its impact on soil.
- List the types of liming material.
- Discuss about the Integrated Nutrient Management System.

### 5.3.1: Implementation of Amendment

#### Say

Soil amendments are elements added to the soil, such as natural fertiliser (for example, compost), peat moss, manure or chemical fertiliser, to improve its capacity to support plant life.

#### Explain

- The need for amendment
- The effect of lime amendment
- The types of liming materials
- The selection of liming materials

#### Elaborate

##### Types of Liming materials

- **Calcium carbonate:** It generally contains 75–95 percent  $\text{CaCO}_3$ , corresponding to 42–53 percent  $\text{CaO}$ .
- **Calcium magnesium carbonate (dolomite):** Its different types contain 15–40 percent  $\text{MgCO}_3$  and 60–80 percent  $\text{CaCO}_3$ . These products are suitable for acid soils that are also Mg deficient.
- **Quicklime ( $\text{CaO}$ ) and slaked lime  $\text{Ca(OH)}_2$ :** These are quick-acting amendments for the neutralization of soil acidity, but they are generally more expensive than natural limes.

##### Selection of liming materials

- In principle, all liming materials can be applied on all soils, but the choice of material depends mainly on soil texture, local availability and cost.

## Elaborate

- Medium to heavy soils (texture of loam and clay) can be neutralised rapidly with quicklime. However, to maintain the optimal reaction, slow-acting carbonates are more suitable.
- In coarse-textured soils (sand and loamy sand), carbonate lime is preferable because of the lower risk of over liming where an excessive amount is applied or where the distribution is not uniform.
- Another aspect of the choice is the presence of by-products. Some limes also contain nutrients other than Ca, some clay minerals, organic matter or micronutrients, which makes them more Valuable for sandy soils.

## Ask

- What is the need for making amendments in soil?
- The participants to list the effects of lime amendment on soil.

## Activity

Call upon some participants, divide them into group and give a task of preparing charts on:

The impact of application of lime on the soil pH.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

## Notes for Facilitation

- Show videos on lime amendment and its effects on soil.
- Brief the participants on how to identify the need for soil amendments.
- Give an idea on the special role of liming material.

## 5.3.2: Integrated Nutrient Management

### Say

Integrated Nutrient Management System (INMS) is defined as maintenance or adjustment of soil fertility and supply of plant nutrient to an optimum level for sustaining the desired crop productivity through optimisation of benefit from all possible resources of plant nutrients in an integrated manner.

### Explain

The following topics:

- INM , its components and importance

### Activity

Ask the participant to self study about the Integrated Nutrient Management (INM).

Skill Practice	Time	Resources
Self Study	1 Hour	Participant Handbook, Notepads, Pens

### Notes for Facilitation

- Define the term INMS.
- List the key areas which are covered in this concept.
- Ensure that all the participants understand the importance of INMS.

### 5.3.3: Integrated Nutrient Management Practices

#### Explain

The following topics:

- Soil cultivation.
- Using cover crops.
- Composts and animal manures to improve soil fertility.
- Soil amendments and supplemental fertilisers.
- Crop rotation and crop sequencing.

#### Practical

##### Practical - 1

- Take all the participants to the lab.
- Show them the steps to be followed while growing cover crops.
- Ask them to make a note of the observations made.

##### Practical - 2

- Ask the participants to make a group of 5 to 6 members each.
- Instruct them to collect the soil samples and add farmyard manure to the collected sample.
- Ask the participants to make a note of the differences observed before and after adding the manure.

#### Demonstrate

The crop rotation plan, explain the procedure and its benefits.

#### Notes for Facilitation

- Give a detailed explanation of INM practices.
- List the advantages of each practice.
- Ensure that the participants are able to differentiate among all the INM practices.

## UNIT 5.4: Soil Health Card Portal Management

### Unit Objectives

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

- Explain soil health card.
- Outline the benefits of the soil health card scheme.
- Discuss about GPS and GIS.
- Prepare the soil fertility map.

### 5.4.1: Soil Health Card

#### Ask

- What is SHC portal?
- List the benefits of SHC?
- Why is it important to examine the soil health?

#### Explain

The following topics:

- What is a Soil Health Card (SHC)
- Working process of the Soil Health Card
- Benefits of the Soil Health Card scheme to farmers
- Soil Health Card portal

#### Demonstrate

Soil health card to the participants.

#### Practical

Visit the website [www.soilhealth.dac.gov.in](http://www.soilhealth.dac.gov.in) and show how to use the soil health card portal.

## Notes for Facilitation

- Explain the components of SHC with the help of its printed copy.
- Brief them on the major areas which are tracked with the help of SHC portal.

## 5.4.2: Preparation of Soil Fertility Map

### Explain

The following topics:

- Soil fertility map.
- Steps involved in the preparation of soil fertility maps.
- Major functions of fertility maps.

### Practical

- Perform soil sampling process .
- Ask the participants to make a note of the observations made.

### Demonstrate

The soil fertility map and explain.

### Activity

- Ask the participants to make a group of 5 to 6 members each.
- Give them a task of preparing soil fertility map on a chart paper.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

## Notes for Facilitation

- Brief them on the benefits of soil sampling and analysis.
- Introduce the participants to soil fertility map.
- Make the participants to get well acquainted knowledge about the fertilty map.

### 5.4.3: GIS and GPS

#### Say

Geographic Information System (GIS) is a system designed to capture (information from the GPS), store, manipulate, analyse, manage and present spatial or geographic data.

GPS is a space based navigation and positioning system, which helps to determine the exact position of an object on the earth surface in terms of geographical co-ordinates.

#### Explain

The following points:

- What is GIS and GPS?
- The role of GIS and GPS in soil fertility maps.

#### Ask

- What are the advantages of the GIS and GPS in the soil fertility map?
- What is the structure of the GIS fertility map?

#### Notes for Facilitation

- Differentiate the between GIS and GPS.
- Explain the structure of GIS.
- Demonstrate the GPS device in the class and explain how to use it.

#### Summary

In this chapter, the participants have learnt about:

- The determination process for the quantity of elements.
- The soil pH and conversion factor.
- The soil fertility management and the nutrients involved in it.
- The classification of plant nutrients.
- The dosage of fertilisers and micronutrients.
- The soil amendment, its implementation and types.
- The components of INM, its importance and its practices.
- The SHC and SHC portal management.
- The soil fertility map, GIS, GPS and their uses.

## Exercise

**Briefly answer the following questions:**

1. Define Molarity and Normality?

A one-molar (M) solution contains one mole or one molecular weight in grams of a substance in each liter of the solution.

The normality of a solution is the number of gram equivalents of the solute per litre of the solution.

2. Mention the stages of Nutrients consumption?

- Critical range
- Sufficient range
- Luxury consumption
- Toxicity range

3. Enumerate the importance of soil fertile management?

- Improved crop quality
- Increased yields
- Save money on unnecessary fertiliser
- Accurate year to year record keeping
- Better environmental stewardship
- Comply with water quality regulations

4. What are the various factors considered while recommending the fertiliser and micronutrient dose?

- Soil type
- Soil pH
- Yield target
- Crop nutrient requirement
- Method of fertiliser application
- Management of the crop

5. What is a Soil health card?

Soil Health card is a printed report card issued to farmers once in three years indicating the status of their soil in terms of 12 parameters, namely;

- N,P,K (Macronutrients)
- S (Secondary- nutrient)
- Zn, Fe, Cu, Mn, Bo (Micro - nutrients)
- pH, EC, OC (Physical parameters)

The SHC also indicates fertiliser recommendations and soil amendment required for a farmer.









## Key Learning Outcomes



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

- Outline the responsibilities of the lab analyst.
- Discuss about the data entry work taken by the lab assistant.
- Explain about the sample registration .
- Outline the dispatch of soil health card.
- Discuss about the equipment calibration.
- Outline the different types of lab equipment and labwares.
- Discuss about the electronic conductivity.
- Outline the activities carried out by the lab assistant regarding the soil health card.
- Communicate well with supervisors, fellow workers and customers.
- Outline the good lab practices.

## Resources to be Used



- Laptop
- Whiteboard
- Marker
- Projector

## Time Line



**Total time needed for facilitation - 10 Hours.**

- Theory Duration - 05:00 Hours.
- Practical Duration - 05:00 Hours.

## UNIT 6.1: Monitor and Guide the Activities of the Lab Assistant

### Unit Objectives

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

- Monitor the activities performed by the lab assistant.
- Perform the data entry work.
- Monitor the execution of sample registration.
- Discuss about the dispatch of soil health card.

### 6.1.1: Monitoring the Lab Assistant

#### Say

Monitor/supervise the lab assistant for the proper upkeep of the laboratory equipment and assist him in the logistics and co-ordination of experiments along with the observations being carried out in the laboratories.

#### Explain

- The roles and responsibilities of a lab analyst.
- The role regarding the data entry.

#### Demonstrate

The method for sterilising the glasswares.

#### Activity

- Take all the participants to a lab.
- Demonstrate the safe placing of the chemical containers.

Skill Practice	Time	Resources
Field Visit	1 Hour	Participant Handbook, Notepads, Pens

## Notes for Facilitation

- Ensure that the participants understand the need for sterilising the glasswares.
- Explain the benefits of placing the chemical containers safely.

## 6.1.2: Sample Registration and Dispatch of Soil Health Card

### Explain

- The main activities of a lab analyst during registration of SHC.
- The main activities of a lab analyst during the dispatch of SHC.

### Elaborate

#### Soil sample registration

##### The main activities of the lab analyst is to:

- Perform pre-analytical functions such as collecting samples and other data, processing specimens and preparing special chemicals called reagents for use in testing.
- Be familiarized with the computer knowledge to do a sample registration.
- Ensure that weather the lab assistant has received the sample or not.
- Generate the receipt with the help of the samples that is already registered in the portal and also submitting the required data in the portal.

#### Soil Health Card dispatch

##### The activity of the lab analyst in dispatching the card is to:

- Oversee the lab assistant in preparing the roster of village for sampling of soils.
- Superintend the lab assistant in the interpretation and analysis of the nutrient status of the soils
- Oversee the lab assistant in recommending the fertilisers and other nutrients dosage for the good yield of the crop.
- Oversee the lab assistant in recommending the soil amendments.
- Assist the lab assistant in the distribution of the soil health card to the farmers in the span of every 3 years.
- Ensure that all the details in the soil health card is valid or not for a collected sample.

## Notes for Facilitation

- Brief the participants on the importance of SHC.
- Explain how to make use of SHC portal.

## UNIT 6.2: Equipment Calibration and Maintenance

### Unit Objectives

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

- Outline the types of lab equipment and labware.
- Explain the calibration and maintenance of lab equipment.
- Discuss about the post experiment observations.

### 6.2.1: Calibrating the Equipment

#### Say

Any laboratory needs to verify periodically the calibrations of their electronic measuring systems, in order to produce reliable and accurate results.

#### Explain

**Calibration of Equipment:** It is a process which is applied to quantitative measuring or metering of equipment to assure its accurate operation throughout its measuring limits. Calibration of equipment refers to hardware calibration which will be performed by the company engineer and subsequently will be validated by checking QC/reference material. Equipment calibration must include technical aspects such as checking of optical systems, temperature, pipette probe, voltage etc. The company engineer should provide a calibration certificate with relevant details. Correct QC/reference material values indicate that the calibration of the equipment is according to the prescribed standards. If the results are beyond the acceptable limits, the source of error should be identified and the equipment should be recalibrated.

Validation must be done just after calibration of the system with the use of appropriate control material. This provides reassurance that the system and operator are working correctly. Thereafter, validation is done periodically according to user requirement and as written in the SOP manual. The responsibility of validation usually rests with the Lab technician.

Validation gives information on:

- Chemical and instrumental drift
- Assay stability

## Ask

- What is the need for calibrating the equipment?
- What is validation?
- What information does validation provide?

## Notes for Facilitation

- Define what is meant by calibration.
- Explain the importance of calibration.
- Make the participants understand the need for validation.

## 6.2.2: Types of Equipment and Labwares

### Explain



- The list of equipment in laboratory.
- The list of labwares used in laboratory.

### Demonstrate



All the equipment and labwares used in the laboratory and explain their uses.

### Activity



Call upon some participants, divide them into group and give a task of preparing charts on:

- List of lab wares and equipments used in laboratory.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Drawing sheets, Markers

### Notes for Facilitation



- Familiarise the participants with the lab equipment and labwares.
- Give them a detailed explanation on their uses.
- Ensure that all the participants know how and when to use these equipment and labwares.

## 6.2.3: Experimental Observations and EC Registration

### Say



Lab analyst should observe the ongoing experiments and always adhere to the accuracy and precision of the results.

### Explain



- The responsibilities of the lab assistant
- What is electrical conductivity?

## Ask

- Define electrical conductivity.
- What is the importance of determining EC?

## Demonstrate

The electrical conductivity meter and explain how to operate it.

## Notes for Facilitation

- Familiarise the participants with all the major responsibilities of a lab assistant.
- Refer Fig: 6.2.3 (b) on page 141 in the Participant Handbook and explain the effect of temperature on EC.

## UNIT 6.3: Basic Terms and Standard Solution Preparation

### Unit Objectives

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

- Discuss about the basic terminologies to be known in the preparation of the standard solution.
- Outline the method of preparing the standard solution.

### 6.3.1: Basic Terminologies

#### Explain

The following topics:

- Standard solution
- Molarity
- Normality
- Percentage composition by weight
- Percentage composition by volume
- Milli equivalent per litre
- Titration

#### Ask

- Define molarity of a solution.
- What is titration?

#### Notes for Facilitation

- Ask the participants to define the basic terminologies used in chemical analysis of soil and water.
- Clarify all the doubts of the participants.
- Help the participants to differentiate the terminologies to avoid confusion.

## 6.3.2: Preparing 1000ppm Standard Solution

### Explain



- The procedure to be followed before preparing a solution
- How to prepare a 1000 ppm solution for zinc sulphate cadmium nitrate and tetrahydrate
- Methods of preparation of standard solutions and the reagents used.
- Reagents and the types of reagents used in the laboratory.

### Elaborate



#### Different types of chemicals/reagent and their Uses

- Deionised water: it is used in flame photometry, gas humidifying chambers, electrode maintenance and instrument cleaning.
- Acetone: It is a colourless, volatile liquid made up of carbon, hydrogen and oxygen atoms. The acetone is commonly used to rinse the glasses containing residue and solids.
- Methylene chloride: Methylene chloride is a chlorinated hydrocarbon that has been used as an inhalation anesthetic and acts as a narcotic in high concentrations. Its primary use is as a solvent in manufacturing and food technology.
- Concentrated nitric acid: Proper growth of plants requires fertilisers such as nitrogen based fertilisers, phosphorus and potassium based fertilisers etc. Mainly nitrogen based fertilisers are manufactured with the help of nitric acid. It is also involved in the laboratory such as for cleaning equipment etc.
- Concentrated hydrochloric acid: Hydrochloric acid is a strong corrosive acid that is commonly used as a laboratory reagent. It is also used to control the pH and helps to digest the samples during the analysis in the laboratory.

### Demonstrate



The different methods of preparing the 1000ppm standard solution for different reagents.

### Ask



- How to prepare the 1000ppm standard solution?
- What is a reagent? Name the types of chemical reagents.

## Notes for Facilitation

- Encourage the participants to define the procedures followed in preparing the 1000ppm solution.
- Clarify the doubts of the participants by demonstrating the procedure of preparing the standard solution.

## UNIT 6.4: Soil Health Card Portal Registration

### Unit Objectives

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

- Discuss the training given to the lab assistant regarding the soil health card.

### 6.4.1: SHC Portal Registration

#### Explain

- What is meant by portal uploading/registering of soil health card?
- The procedure to be followed while registering an SHC.

#### Demonstrate

The procedure to register on Soil Health Card Portal.

#### Activity

Ask the participant to perform the procedure for SHC portal registration as per the demonstration.

Skill Practice	Time	Resources
SHC Portal Registration	1 Hour	Computer System, Participant Handbook, Notepads, Pens

#### Notes for Facilitation

- Familiarise all the participants with the pre-requisites of a lab analyst to train a lab assistant.
- Perform the SHC portal registration procedure.
- Explain the steps involved in the registration process.

## UNIT 6.5: Communication and Good Lab Practice

### Unit Objectives

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

- Explain about the effective communication.
- Outline the good lab practices.

### 6.5.1: Need for Effective Communication

#### Explain

The following are the tips for an effective communication:

- Keep it simple and to the point
- Be positive
- Listen actively
- Avoid interrupting
- Check understanding regularly
- Use visuals

#### Elaborate

The responsibilities of a lab assistant, while communicating with customer:

- Understand customer's problems.
- Ask more questions to confirm the concern of the customer, if required.
- Show concern towards customers and show an effort to solve their problem.
- Interact with the customer with smiling face so that the customer feels happy.
- Maintain an eye contact with a smile.

#### Ask

- What do you understand by effective communication?
- What are the responsibilities of a lab assistant while communicating with a customer?

## Activity

- Ask the participants to make a group of 5 to 6 members each.
- Give them a task of role-play on how to communicate with the customers.

Skill Practice	Time	Resources
Role-play	30 Minutes	Participant Handbook, Notepads, Pens

## Notes for Facilitation

Brief the participants about the importance of an effective communication.

## 6.5.2: Good Lab Practices (GLP)

### Say

Good lab practice is a set of principles intended to assure the quality and integrity of a laboratory studies that are intended to support research or marketing permits for products regulated by government agencies.

### Explain

- The need to follow GLP
- The GLP which a lab assistant should follow.

### Demonstrate

A chart on the list of items that are not allowed in a lab.

## Notes for Facilitation

- Ensure that all the participants follow GLP.
- Ask them to discuss on the important GLP.

## Summary

In this chapter, the participants have learnt about:

- The roles and responsibilities of a lab analyst.
- The sample registration and dispatch process of SHC.
- The method of calibrating and maintaining an equipment.
- The types of lab equipment and labwares.
- The basic terminologies and the procedure for preparing 1000ppm standard solution.
- The importance of effective communication, GLP and its effects.

## Exercise

**Briefly answer the following questions:**

1. Mention any five major roles of a lab analyst.

- Oversee the lab assistant in maintaining a note of insufficient chemicals in the laboratory.
- Supervise the lab assistant to maintain the data of calibrated equipment.
- Oversee the lab assistant in maintaining a record of the experiments which are done.
- Superintend the lab assistant to make a list of the broke down parts of the equipment.
- Superintend the lab assistant in collecting and maintain the data of the different samples prepared.

2. Explain the activities of lab analyst while sample registration.

- Perform pre-analytical functions such as collecting samples and other data, processing specimens and preparing special chemicals called reagents for use in testing.
- Be familiarized with the computer knowledge to do a sample registration.
- Ensure that weather the lab assistant has received the sample or not.
- Generate the receipt with the help of the samples that is already registered in the portal and also submitting the required data in the portal.

3. Describe the activities of a lab analyst while dispatching soil health card?

- Oversee the lab assistant in preparing the roster of village for sampling of soils.
- Superintend the lab assistant in the interpretation and analysis of the nutrient status of the soils.
- Oversee the lab assistant in recommending the fertilisers and other nutrients dosage for the good yield of the crop.
- Oversee the lab assistant in recommending the soil amendments.
- Assist the lab assistant in the distribution of the soil health card to the farmers in the span of every 3 years.
- Ensure that all the details in the soil health card is valid or not for a collected sample.

4. Define calibration of an equipment.

Calibration of equipment is a process which is applied on an equipment to assure its accurate operation throughout its measuring limits. Calibration of equipment refers to hardware calibration which will be performed by the company engineer and subsequently will be validated by checking QC/reference material.

5. What are the steps to be taken for an effective communication?

- Keep it simple and to the point
- Be positive
- Listen actively
- Avoid interrupting
- Use visuals
- Check understanding regularly









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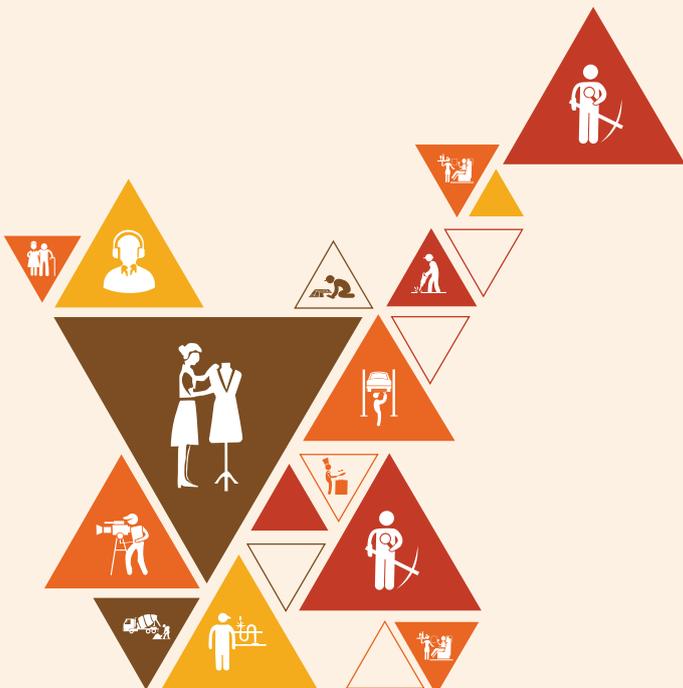


## 7. Soft Skills, Computer and Financial Literacy

Unit 7.1 – Basic communication and organisational skills

Unit 7.2 – Important documents

Unit 7.3 – Basic computer and financial literacy



## Key Learning Outcomes



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

- Improve basic communication skills.
- Adapt organisational skills and enhance the work efficiency.
- Explain the importance of documents and their types.
- Identify the importance of basic computer skills in a laboratory.
- List the advantages of computer processing.
- Discuss what is SHM (Soil Health Management).
- Identify different types of financial assistance groups.
- Make use of the financial assistance available.

## Resources to be Used



- Laptop
- Whiteboard
- Marker
- Projector

## Time Line



**Total time needed for facilitation - 4 Hours.**

- Theory Duration - 02:00 Hours.
- Practical Duration - 02:00 Hours.

## UNIT 7.1: Basic Communication and Organisational Skills

### Unit Objectives

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

- Display effective communication at all times.
- Meet all reasonable communication etiquette.
- Identify the importance of organising a research lab.
- Make use of various strategies required to organise a research lab.

### 7.1.1: Communication Tips

#### Say

Communication plays a vital role in human life. It not only helps to facilitate the process of sharing information and knowledge, but also helps people to develop relationships with others.

#### Explain

The tips for effective communication with the employees:

1. Be clear and concise
2. Set the tone at the top
3. Understand your colleague
4. Use many channels
5. Notify employees first
6. Match actions with words
7. Emphasise face-to-face communication
8. Communicate regularly
9. Measure effectiveness
10. Facilitate conversation

## Activity

- Ask the participants to make groups of three to four members each.
- Ask them to perform group discussion about the importance of communication.

Skill Practice	Time	Resources
Group Discussion	30 Minutes	Notepads, Pens

## 7.1.2: Effective Communication

### Explain

Effective communication is important for the development of an organisation. It is something which helps to perform the basic functions of management- planning, organising, motivating and controlling.

### Elaborate

#### General Communication Tips

**It pays to be mindful for the following factors while communicating with others:**

- Tone of voice
- Choice of words
- Non-verbal cues: Emotions and body language
- Relationships between communicating parties

### Ask

- What do you understand by effective communication?
- How can workplace relationships be improved?

### Notes for Facilitation

- Familiarise all the participants with the importance of effective communication.
- Organise group discussions on effective communication at workplace.
- Brief the participants on the problems caused by miscommunication.

## 7.1.3: Effective Organisation

### Explain



- The need to organise a research lab.
- The strategies to organise a research lab.

### Demonstrate



The procedure to be followed while organising a research lab.

### Elaborate



Here are certain strategies to organize a research lab:

1. Assign Individual Responsibilities:
2. Keep Information Centralized
3. Use Specialized Lab Organization Software or Online Systems

### Activity



Plan a visit to a research lab and ask the participants to organise the lab as per the demo.

Skill Practice	Time	Resources
Organising a Lab	1 Hour	Participant Handbook, Notepads, Pens

## UNIT 7.2: Important Documents

### Unit Objectives

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

- Outline the benefits of proper records management.
- List out various types of documents and certificates.
- Discuss the importance of various types of documents and certificates.

### 7.2.1: Record Management

#### Explain

- Certification and its importance
- Various types of documents and their uses.

#### Demonstrate

Various types of documents and explain their uses.

#### Activity

Ask the participants to make charts of various types of documents and their uses.

Skill Practice	Time	Resources
Chart Making	1 Hour	Participant Handbook, Notepads, Markers, Pens

## UNIT 7.3: Basic Computer and Financial Literacy

### Unit Objectives

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

- Identify the importance of basic computer skills in a testing lab.
- Discuss the advantages of computer processing.
- List various groups which provide financial assistance to establish testing labs.
- Make use of the financial assistance to establish testing labs.

### 7.3.1: Basic Computer Skills

#### Explain

- The importance of having computer skills.
- The advantages of computer processing.

#### Elaborate

Computer processing offers the advantage of:

- Easier manipulation of large data sets
- Reduced errors in calculation of recommendations
- Preparation of reports
- Automated invoicing and addressing
- Ready access to historical data for preparation of soil test summaries

## Notes for Facilitation

- Familiarise all the participants with the pre-requisites of a lab analyst to train a lab assistant.
- Perform the SHC portal registration procedure.
- Explain the steps involved in the registration process.

## 7.3.2: Basic Financial Literacy

### Elaborate

#### Financial Assistance:

**1. For Self Help Groups (SHGs):** There are Farmer Joint Liability Groups, Farmer Cooperative Societies, Farmer Producer Organizations (FPOs), Input Retail outlets, School/colleges located in the district. For establishment of mini Soil Testing Lab upto a maximum project cost of Rs. 10 lakhs. Financial assistance at 80% of the project cost will be provided for such labs for purchase of machinery and equipment, chemicals and glass wares, miscellaneous laboratory articles and contingencies.

**2. For Village entrepreneur (18 – 40 age group):** There are Input Retailers, provide financial assistance at 40% of the project cost of Rs.10.00 lakh will be provided to Village entrepreneur (18 – 40 age group) for establishment of mini soil testing lab, for purchase of machinery and equipment, chemicals and glass wares, miscellaneous laboratory articles and contingencies.

**Funding pattern:** Under this Scheme, subsidy will be shared between Government of India and States in the ratio of 90:10 for NER including Himalyana States and 60 :40 for other states.

**Fund flow mechanism for establishment of mini labs:** INM Division will release grant- in- aid to State. The DLEC will receive funds from State Nodal Deptt for implementation of the programme. Similarly NCOF will release funds NABARD under CISS. In case of credit requirement application may be forwarded by DLEC to lead bank for providing NABARD subsidy.

**Role of Panchayati Raj Institutions (PRIs):** The State Government and other designated implementing agencies, to the extent possible, will ensure active participation of the Panchayati Raj Institutions (PRIs) in the implementation of this Scheme.

**Monitoring:** District Agriculture Officer will be responsible for monitoring of the projects as it is to be implemented under his guidance and targets / time table is fixed by him.

### Activity

Ask the participants to perform group discussion on the need for financial literacy.

Skill Practice	Time	Resources
Group Discussion	1 Hour	Participant Handbook, Notepads, Pens

## Summary

In this chapter, the participants have learnt about:

- Benefits of effective communication at workplace.
- Reasonable communication etiquette.
- The importance of organising a research lab.
- Various strategies required to organise a research lab.
- The benefits of proper records management.
- Various types of documents and certificates.
- The importance of basic computer skills in a testing lab.
- The advantages of computer processing.
- Various groups which provide financial assistance to establish testing labs.
- The importance of various types of documents and certificates.

## Exercise

**Briefly answer the following questions:**

1. List the tips for effective communication with the employees.

- Be concise and clear.
- Match actions with words.
- Set the tone at the top.
- Emphasise face-to-face communication.
- Understand your colleague.
- Communicate regularly.

2. Explain the strategies used to organise a research lab.

- Assign individual responsibilities.
- Keep information centralised.
- Use specialised lab organisation software or online systems.

3. Explain the benefits of proper records management.

- Organising information for retrieval when required.
- Ensuring compliance with legal and regulatory record keeping requirements, thereby avoiding fines and other penalties.
- Reducing risks in litigations, government investigations and the legal discovery process.
- Reducing labour requirements for the creation, organization, retrieval and dissemination of recorded information.
- Reducing the time and effort required to reconstruct vital information in the event of disaster, theft, and other losses.

4. List the advantages of computer processing.

- Easier manipulation of large data sets
- Reduced errors in calculation of recommendations
- Preparation of reports
- Automated invoicing and addressing
- Ready access to historical data for preparation of soil test summaries







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& ENTREPRENEURSHIP



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## 8. Employability & Entrepreneurship Skills

Unit 8.1 – Personal Strengths & Value Systems

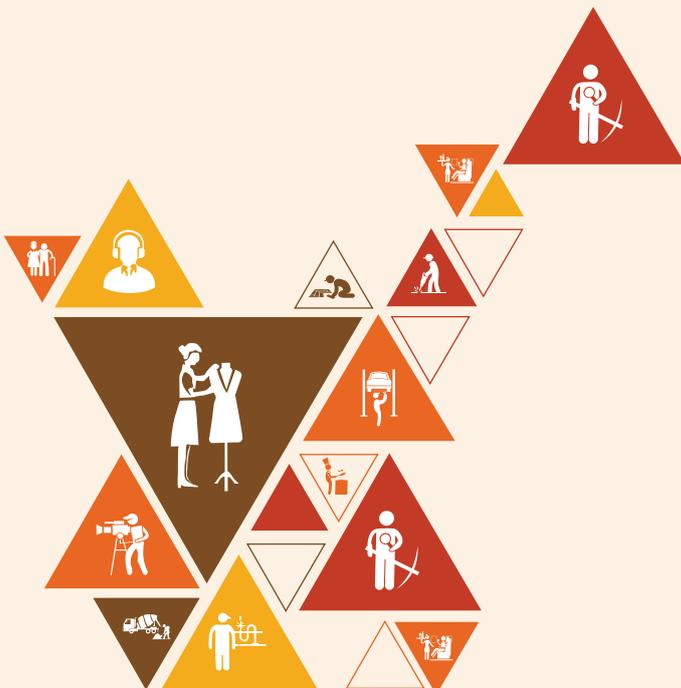
Unit 8.2 – Digital Literacy: A Recap

Unit 8.3 – Money Matters

Unit 8.4 – Preparing for Employment & Self Employment

Unit 8.5 – Understanding Entrepreneurship

Unit 8.6 – 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

1. 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?"
2. Have one of the participants write their contributions on a flip chart sheet.
3. Write down your own list of covered material in the training on another flip chart sheet.
4. Compare the two sheets, commenting on what will and what will not be covered during the training.
5. Set some ground rules for the training sessions. Ask the participants to put these rules on a flipchart and display it in the class.
6. You may get back to those sheets once again at the end of the last session of the training.
7. 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.
8. 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
9. Explain the contents that are going to get covered one by one and connect it with the expectation mapping done earlier.
10. 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

1. Defining the objectives in the beginning of the units sets the mood for the unit.
2. To begin with the end in mind sets the expectations of the participants as what could be the important takeaways from the session.
3. It is also a way of making participants take responsibility of their own learning process.
4. 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 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 8.1: 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 8.1.1: 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 8.1.2: 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 8.1.3: 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 8.1.4: 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 8.1.5: 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.

Spring'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 Sebastiyar 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 8.1.6: 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.

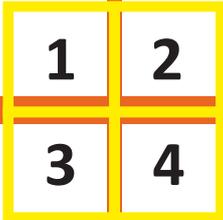
- **Category 2: Not Urgent/Important**
  - This is where you want to spend most of your time.
  - This category allows you to work on something important and have the time to do it properly.
  - This will help you produce high quality work in an efficient manner.
  - The tasks in this category are probably 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.	

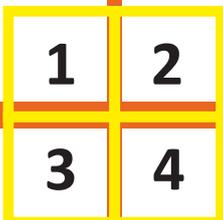
**URGENT-IMPORTANT GRID**

<p><b>URGENT/ IMPORTANT</b></p> <ul style="list-style-type: none"> <li>• Meetings</li> <li>• Last minute demands</li> <li>• Project deadlines</li> <li>• Crisis</li> </ul>	<p><b>NOT URGENT/ IMPORTANT</b></p> <ul style="list-style-type: none"> <li>• Planning</li> <li>• Working towards goals</li> <li>• Building relationship</li> <li>• Personal commitments</li> </ul>
<ul style="list-style-type: none"> <li>• Interruptions</li> <li>• Phone calls/ E-mails</li> <li>• Other people's minor demands</li> </ul> <p><b>URGENT/ NOT IMPORTANT</b></p>	<ul style="list-style-type: none"> <li>• Internet surfing</li> <li>• Social media</li> <li>• Watching TV</li> </ul> <p><b>NOT URGENT/ NOT IMPORTANT</b></p>



**URGENT/ IMPORTANT GRID format**

<p><b>URGENT/ IMPORTANT</b></p>	<p><b>NOT URGENT/ IMPORTANT</b></p>
<p><b>URGENT/ NOT IMPORTANT</b></p>	<p><b>NOT URGENT/ NOT IMPORTANT</b></p>



## 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 the participants. 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 8.1.7: 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 8.1.8: 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."

His 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.





## UNIT 8.2: 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 8.2.1: 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 8.2.2: 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 8.2.3: 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.





## UNIT 8.3: 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 8.3.1: 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 atleast 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 8.3.2: 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 the participants 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 Personal 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.**

<b>Photograph</b>	XXX Bank		
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	
<b>Applicant Details:</b>			
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.			
Occupational/Profession			
Annual Income			
No. of Dependents			

<b>Detail of Assets</b>	Owning House : Y/N	Owning Farm :
	Y/N	
	No. of Animals :	Any other :
<b>Existing Bank A/c. of family members / household</b>	Y / N	If yes, No. of A/cs. _____
<b>Kisan Credit Card</b>	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.

**Declaration:**

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

**Place:**

**Date:**

**Signature / LTI of Applicant**

**Nomination:**

I want to nominate as under				
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.

**Place:**

**Date:**

**Signature / LTI of Applicant**

**Witness(es)\***

1. \_\_\_\_\_

2. \_\_\_\_\_

\*Witness is requires only for thumb impression and not for signature

## UNIT 8.3.3: 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

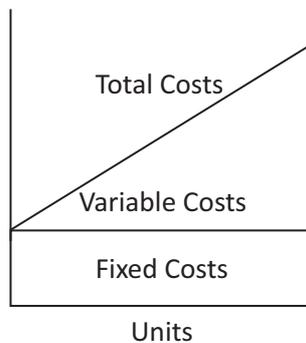
1. Rent
2. Telephone bill
3. Electricity bill
4. Machinery
5. Insurance
6. Office supplies/ Raw materials
7. Employee salaries
8. Commission percentage given to sales person for every unit sold
9. Credit card fees
10. Vendor bills

### 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 8.3.4: 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 Samridhi 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 8.3.5: 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.





## UNIT 8.4: 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 8.4.1: 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 organisation 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 organisation.
  - ♦ 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 8.4.2: 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 8.4.3: 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 organisation, 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 8.4.4: 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 8.5: 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 8.5.1: 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 8.5.2: 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 organisation?

**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 8.5.3: 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 have 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 organisation? 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 organisation 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 organisation 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 8.5.4: 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 organisation, 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 summarising the key points and answering questions.

## UNIT 8.5.5: 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 8.5.6: 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

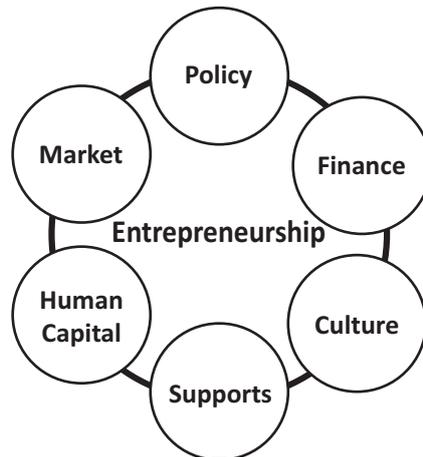
- Making a poster showing the entrepreneurship support eco-system.

## 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 8.5.7: 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 8.5.8: 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.





## UNIT 8.6: 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 8.6.1: 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 8.6.2: 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 8.6.3: 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 8.6.4: 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.

<b>MY BUSINESS PLAN</b>
Executive Summary: What is your Mission Statement?
Business Description: What is the nature of your business?
Market Analysis: What is your target market?
Organisation and Management: What is your company's organisational 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. Organisation 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 8.6.5: 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 know 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.

<b>CHECKLIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH LOAN APPLICATION (Common for all banks)</b>
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 8.6.6: 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 8.6.7: 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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सत्यमेव जयते  
GOVERNMENT OF INDIA  
MINISTRY OF SKILL DEVELOPMENT  
& ENTREPRENEURSHIP



N · S · D · C  
National  
Skill Development  
Corporation

Transforming the skill landscape

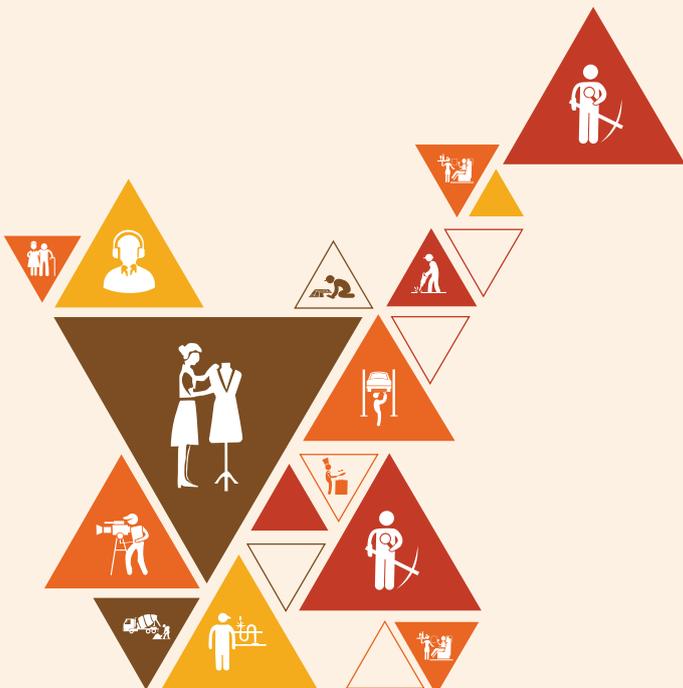


**ASCI**  
Agriculture Skill Council of India

## 9. Annexure

Annexure I – Training Delivery Plan

Annexure II – Assessment Criteria



## Annexure I

### Training Delivery Plan

<b>Program Name:</b>	Soil & Water Testing Lab Analyst		
<b>Qualifications Pack Name &amp; Ref. ID</b>	AGR/Q81.3, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	
<b>Pre-requisites to Training (if any)</b>	B.Sc. Agriculture preferably		
<b>Training Outcomes</b>	<p><b>After completing this programme, participants will be able to:</b></p> <ul style="list-style-type: none"> <li>• <b>Well equipped with sanitation &amp; safety guidelines of the soil &amp; water testing lab:</b> disinfect/sanitize/sterilize lab equipments &amp; labwares, use PPEs, first aid kit &amp; fire extinguishers, proper waste disposal</li> <li>• <b>Conduct Physical &amp; Chemical analysis of soil &amp; water:</b> calibrate equipments, conduct soil &amp; water test on different parameters, record &amp; analyze data</li> <li>• <b>Prepare soil &amp; water health card:</b> calculate different nutrients present &amp; required as per the crop, recommend fertilizer &amp; nutrient doses as per the crop, prepare &amp; upload soil &amp; water health cards</li> <li>• <b>Adhere Good lab Practices and train the assistant on the same:</b> oversee the activities of the lab assistant for ensuring smooth functioning of the lab &amp; adoption of good lab practices</li> </ul>		

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration HH:MM
1	Introduction T: 5:00 P: 10:00 (HH:MM)	About the training programme	<ul style="list-style-type: none"> <li>• Outline the overview of the training programme.</li> <li>• Develop behavioural etiquette and technical instructions during the entire training programme.</li> </ul>		Facilitator led discussion	Whiteboard, Marker	T: 1:00
		Types of Soils and Nutrients	Explain the types of soils and nutrients required for the plant growth.		Facilitator led discussion	whiteboard, marker, audio visual aids	T: 1:00 P: 2:00
		Soil-water test and Integrated Nutrient Management	Discuss the significance of soil and water test.		Facilitator led group discussion, practical demonstration, case study	Audio visual aids, charts	T: 2:00 P:4:00
		About the Job Role - Soil & Water Analyst Testing Lab	<ul style="list-style-type: none"> <li>• Discuss about the role of Soil and Water Testing Lab Analyst.</li> <li>• Outline the general discipline in the laboratory.</li> </ul>		Facilitator led discussion, question answer session	Whiteboard, Marker	T: 1:00 P:4:00

2	Adhere to Sanitation and Safety Guidelines of the Lab T: 5:00 P: 15:00 (HH:MM)	Preliminary Manoeuvres of Laboratory	<ul style="list-style-type: none"> <li>Make use of the Personnel Protective Equipment (PPE).</li> <li>Perform the pre-check and disinfect the equipment.</li> <li>Interpret the glassware cleaning procedure.</li> <li>Perform the sterilisation of the apparatus.</li> </ul>	AGR/N8101 PC8 to PC15, KB4, KB5, SB1 to SB3, SB7 to SB10	Facilitator led discussion, group participation	, White board, Marker, Chart of prohibited items, disinfectants, PPE, sterilization equipments like oven, autoclave etc.	T: 1:00 P: 5:00
		Identification of Hazardous Waste	<ul style="list-style-type: none"> <li>Identify the methods for handling toxic materials.</li> <li>Summarise the procedures for cleaning of spills.</li> </ul>	AGR/N8101 PC16, PC17, KB6, KB7, SB5, SB6	Facilitator led discussion, Practical Demonstration, Collaborative training, Group Discussion	Participant Handbook, White board, Marker, audio visual aids like PPT, charts etc.	T: 2:00 P: 4:00
		Disposal of Hazardous Waste	Classify the waste and their proper disposal.	AGR/N8101, PC17, KB6, KB7, SB5, SB6	Group Discussion, Classification exercise, practical demonstration	Classification Chart, Audio visual aids	T: 1:00 P: 3:00
		Safety Precautions and First-aid Application	<ul style="list-style-type: none"> <li>Identify safety precautions laid by the manufacturer for instruments.</li> <li>Administer the first-aid for the person in need.</li> <li>Use the fire- extinguisher in the emergency situations.</li> </ul>	AGR/N810, PC19 to PC21 KB8, KB9, SA2, SA3, SA4	Facilitator led discussion, Practical Demonstration, Role Playing	White board, marker, PPE, first aid viz., bandages, antiseptic solutions; Fire extinguisher	T: 1:00 P: 5:00
		Operational Risk Management	Control the operational risks and follow the workflow instruction.	AGR/N8101, PC22 KB8, KB9, SA2, SA3, SB4	Practical demonstration, role play	Personal Protective Equipment, Phone Directory	P: 3:00
3	Conduct Soil Physical & Chemical Analysis  T: 20:00 P: 60:00	Soil sampling and its procedure	<ul style="list-style-type: none"> <li>Explain the soil sampling procedure</li> </ul>	AGR/N8108 Kb1, SB8	Facilitator led discussion, Demonstration, Field visit	Soil sampling tools, soil sample collection bag, White board, Marker, audio visual aids, PPT, charts	T: 2:00 P: 5:00
		Soil testing kit and its applications	Make use of soil testing kit	AGR/N8108 Pc19, KB8	Facilitator led discussion, Group Activity/Field visit	White board, Marker, PPT, soil testing kit	T: 2:00 P: 5:00
		Soil physical Analysis	<ul style="list-style-type: none"> <li>Identify the texture of the soil.</li> <li>Estimate the soil moisture percentage.</li> </ul>	AGR/N8108 PC1, PC2, PC3, KB2, KB3 KB4, KB5 KB6,	Facilitator led discussion, Field visit, feel method, soil testing lab visit and demonstration	White board, Marker, charts, PPT, Soil moisture testing lab equipment	T: 2:00 P: 5:30

			<ul style="list-style-type: none"> <li>•Determine the bulk density of the soil.</li> <li>• Analyse the sample and determine the moisture content and hydraulic conductivity</li> </ul>	AGR/N8108 PC4, PC5, KB7, SB7, SA1, SA2	Facilitator led discussion, Field visit, soil testing lab visit and demonstration	White board, Marker, charts, PPT, Soil testing lab	T: 2:00 P: 5:30
		Soil pH and EC determination	<ul style="list-style-type: none"> <li>• Calibrate the equipment</li> <li>•Prepare the soil solution</li> <li>•Estimate the pH of the soil.</li> <li>•Determine the EC of the soil</li> </ul>	AGR/N8108 PC6, PC7, KB22, KB16 SA3, SA4, SB9	Facilitator led discussion, soil testing lab visit and demonstration	White board, Marker, charts, PPT, Soil testing lab, Soil test kit, Soil PH meter	T: 1:30 P: 6:00
		Determination of Organic carbon in Soil	Determine the amount of Soil organic carbon and CaCO <sub>3</sub> .	AGR/N8108 PC8, PC9 KB10, KB15, KB19, SA5, SA6	Facilitator led discussion, soil testing lab visit and demonstration	White board, Marker, board, charts, PPT, Soil testing lab, Soil test kit, Chemical solutions	T: 2:00 P: 5:30
		Determination of Macronutrients in Soil	<ul style="list-style-type: none"> <li>•Calibration equipment</li> <li>•Prepare chemical solutions</li> <li>•Estimate the macro nutrients in the soil.</li> </ul>	AGR/N8108 PC10, PC11 PC12, PC13, PC14 KB 12 to KB21, SB1 to SB8 SA7, SA8	Facilitator led discussion, soil testing lab visit and demonstration	White board, Marker, board, audio visual aids like charts, PPT, Soil test kit, Chemical solutions, Flame photometer	T: 2:30 P: 5:30
		Determination of Micronutrients in Soil	<ul style="list-style-type: none"> <li>•Calibrate equipment</li> <li>•Prepare chemical solutions</li> <li>•Estimate the micro nutrients B, Zn, Cu, Fe, Mn,) in the soil</li> </ul>	AGR/N8108 PC15, to, PC19, KB 12, KB 14 to KB24, SB1 to SB8 SA7, SA8	Facilitator led discussion, soil testing lab visit and demonstration	White board, Marker, board, audio visual aids like charts, PPT, Atomic absorption spectromete r	T: 1:30 P: 6:00
			<ul style="list-style-type: none"> <li>•Determine Conversion Factors for micronutrients</li> <li>•Calculate the nutrient requirement</li> </ul>				T: 1:30 P: 5:30
		Cation Exchange Capacity (CEC)	Determine the soil cation exchange capacity.	AGR/N8108 PC18, SA7 SA8, SA9	Facilitator led discussion, Group Discussion, Practical	White board, Marker, Atomic absorption spectromete r	T: 1:30 P: 5:30
		Reclamation of the Problematic Soil	<ul style="list-style-type: none"> <li>• Calculate the gypsum requirement for the problematic soil.</li> <li>• Identify the procedures to be followed for the restoration of the problematic soil.</li> </ul>	AGR/N8108 PC20 KB20 to KB24, SB1 to SB6	Facilitator led discussion, soil testing lab visit	White board, Marker, Audio visual aids	T:1:30 P: 5:00
4	Conduct Water Sample Analysis  T: 5:00 P: 20:00 (HH:MM)	Determination of Water pH and EC	<ul style="list-style-type: none"> <li>• Understand the procedures</li> <li>•Calibrate the equipment</li> </ul>	AGR/N8109 PC1, PC2, KB1, KB2, KB3 SB9, SB10, SB11, SA7, SA9	Facilitator led discussion, Group Discussion, Water test kit, soil and water lab visit, demonstration	White board, Marker, Notes, lab equipment like pH Meter, apparatus	T: 2:00 P: 4:00

			<ul style="list-style-type: none"> <li>Determine the water pH</li> <li>Estimate electrical conductivity (EC).</li> </ul>	AGR/N8109 PC1, PC2, KB1, KB2, KB3 SB9, SB10, SB11, SA7, SA9	Facilitator led discussion, Group Discussion, Water test kit, soil and water lab visit, demonstration	White board, Marker, Notes, lab equipment like pH Meter, apparatus	T: 1:00 P: 5:00
		Determination of Water Soluble Salts	<ul style="list-style-type: none"> <li>Determine the Total Dissolved Solids (TDS) in water.</li> <li>Determine the Total Suspended Solids (TSS) in water.</li> </ul>	AGR/N8109 PC3, PC4, KB4, KB5, KB6, KB7, KB8	Facilitator led discussion, Group Discussion, Water test kit, soil and water lab visit, demonstration	White board, Marker, Notes, lab equipment water hardness meter, COD meter apparatus	T: 1:00 P: 5:30
		Determination of Dissolved Chemicals in Water	<ul style="list-style-type: none"> <li>Determine the amount of the chemicals dissolved in water.</li> <li>Get acquainted with methods of determining dissolved chemicals in water.</li> </ul>	AGR/N8109 PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, KB12 to KB 17, SA1	Facilitator led discussion, Role play	White board, Marker, Water TDS meter apparatus	T: 1:00 P: 5:30
5	Prepare Soil Health Card  T: 10:00 P: 20:00 (HH:MM)	Calculation of requirement of different elements	<ul style="list-style-type: none"> <li>Determine the quantity of nutrients required for soil analysis.</li> <li>Outline the preparation and standardisation of reagent solutions.</li> <li>Explain the phases of the nutrient consumption in plants.</li> </ul>	AGR/N8110 PC1, PC2, PC3, KB1 to KB11, SA1 to SA3	Facilitator led discussion, Group Discussion,	White board, Marker, pen, paper, calculator	T: 2:00 P: 5:00
			Explain soil fertility and its importance.	AGR/N8110 PC3, KB1 to KB11, SA1 to SA3	Facilitator led discussion, Group Discussion,	White board, Marker, pen, paper, calculator	T: 1:00
		Management of Fertiliser and Micro nutrients	<ul style="list-style-type: none"> <li>Discuss about the fertiliser, micro- nutrients and their recommended doses.</li> <li>Explain the recommended factors for fertiliser and micro-nutrient doses.</li> <li>Outline the importance of manure crops.</li> </ul>	AGR/N8110 PC4, PC5, KB12, KB13 KB14, KB15 KB16, KB17, SA4, SA5, SA6, SA7, SB1, SB2	Facilitator led discussion, Group Discussion,	White board, Marker, pen, paper, calculator	T: 2:30 P: 5:00
		Soil Amendment and Integrated Nutrient Management	<ul style="list-style-type: none"> <li>Explain lime amendment and its impact on soil.</li> <li>List the types of liming material.</li> <li>Discuss about the Integrated Nutrient Management system.</li> </ul>	AGR/N8110 PC6, PC7 KB18, SB3, SB4, SB7 SB8	Facilitator led discussion,	Participant Handbook, White board, Marker, Audio visual aids	T: 2:30 P: 5:30
		Soil Health Card Portal Management	<ul style="list-style-type: none"> <li>Explain Soil Health Card.</li> <li>Outline the benefits of the Soil Health Card scheme.</li> <li>Discuss about GPS and GIS.</li> <li>Prepare the Soil Fertility Map.</li> </ul>	AGR/N8110 PC8, PC9 KB3, KB21, KB22, SB5, SB6, SB9		White board, Marker, audio-visual aids charts, paper, pen	T: 2:00 P: 5:00
6	Supervise and Train Lab Assistant in Good Lab Practices  T: 5:00 P: 5:00 (HH:MM)	Monitor and Guide the Activities of the Lab assistant	<ul style="list-style-type: none"> <li>Monitor the lab assistant activities</li> <li>Discuss the data entry work.</li> <li>Monitor the execution of sample registration</li> <li>Discuss about the dispatch of soil health card.</li> </ul>	AGR/N8111 PC1, PC2, PC3, KB2, KA1, KA2 SA1, SA2, SA3, SB4	Facilitator led discussion, Video demonstration, Role play	Whiteboard, Marker, audio-video aids, pen paper	T: 1:00 P: 2:00

		Equipment Calibration and maintenance	<ul style="list-style-type: none"> <li>Outline the types of lab equipment and lab wares.</li> <li>Explain the calibration and maintenance of lab equipment.</li> <li>Discuss about the post experiment observation.</li> </ul>	AGR/N8111 PC4, PC5, PC6, KB1 SB7, SB8, SB9	Facilitator led discussion, lab visit	Whiteboard, Marker, audio-video, lab equipment, lab ware	T: 2:00 P: 1:30
		Basic Terms and Standard Solution Preparation	<ul style="list-style-type: none"> <li>Discuss about the basic terminologies in the preparation of the standard solution.</li> <li>Outline the method of preparing the standard solution.</li> </ul>	AGR/N8111 PC7, PC8 KB3, KB4, KB5, KB6, KB7, SB1, SB2	Facilitator led discussion, Group activity	Whiteboard, Marker, audio-visual aids, chemical reagents	T:1:00 P: 1:00
		Soil Health Card Portal Registration	<ul style="list-style-type: none"> <li>Discuss the training given to the lab assistant regarding the soil health card.</li> </ul>	AGR/N8111 PC9, KB9, KB9, KB10 SB5, SB6	Facilitator led discussion, demonstration	White board, Marker	
		Communication and Good Lab Practice	<ul style="list-style-type: none"> <li>Explain about the effective communication</li> <li>Outline good lab practices.</li> </ul>	AGR/N8111, PC10, PC11 KB11, KB12 SA4, SA5, SA6, SA7, SB3	Facilitator led discussion, Practical demonstration, Role play	Whiteboard, Marker, visual aids	T: 1:00 P: 0: 30
7	Soft Skills, Computer and Financial Literacy  T: 20 :00 P: 40:00 (HH:MM)	Basic communication and organisational skills	<ul style="list-style-type: none"> <li>Display effective communication at all times .</li> </ul>		Facilitator led discussion, Practical demonstration, Role play	Whiteboard, Marker, audio visual aids, Projector	T: 3:00 P: 5:00
			<ul style="list-style-type: none"> <li>Identify the importance of organising a research lab</li> <li>Make use of various strategies required to organise a research lab</li> </ul>		Facilitator led discussion, Practical demonstration, Role play	Whiteboard, Marker, audio visual aids, Projector	T: 3:00 P: 5:00
			Perform and practice learnt communication and lab organising strategies		Role play, Group activity		T: 1;00 P: 5:00
		Important Documents	<ul style="list-style-type: none"> <li>Outline the benefits of proper records management</li> <li>List various types of documents and certificates</li> </ul>		Facilitator led discussion, Practical demonstration, Role play		T: 2:00 P: 5:00
		Discuss the importance of various types of documents and certificates		Facilitator led discussion, Group activity,	Whiteboard, Marker, audio visual aids, Projector, computer/la ptop	T: 2:00 P: 5:00	
		Basic computer skills and financial literacy	<ul style="list-style-type: none"> <li>Identify the importance of basic computer skills in a testing lab</li> </ul>		Facilitator led discussion, Practical computer demonstration, Role play	Whiteboard, Marker, audio visual aids, Projector, computer/la ptop	T: 3:00 P: 5:00
			Learn the advantages of computer processing		Facilitator led discussion, Practical computer demonstration	Whiteboard, Marker, audio visual aids, Projector, computer/la ptop	T: 3:00 P: 5:00
			Identify groups to provide financial assistance to establish testing labs.		Facilitator led discussion, One to one interaction, case studies	Whiteboard, Marker, audio visual aids, Projector, various schemes	T: 3:00 P: 5:00
Total Duration							240 hrs

S. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration (HH:MM)
1	Employability and Entrepreneurship Skills	Introduction	<ul style="list-style-type: none"> <li>Recognise the importance of general discipline in the class room (<i>dos and don'ts</i>)</li> <li>List expectations from the program</li> <li>Outline the objectives of the program</li> </ul>	-	Classroom lecture/ PPT Question and Answer	Computer, black/whiteboard, marker, chalk, duster, pamphlets/ leaflets, projector	T: 0:30
		Theory Duration (HH: MM) 18:00 Practical Duration (HH: MM) 22:00	Personal Strengths and Value Systems - Adherence to Safety	<ul style="list-style-type: none"> <li>Identify common health issues and tips to prevent them</li> <li>Discuss critical safety habits to be followed by employees</li> </ul>	-	Classroom lecture/ PPT/ Question and Answer/ Group Discussion/ Role play/ Exercises on Health Standards	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklet, gloves, protective goggles, first aid kit, screwdrivers, antiseptic liquid, bandages, searchlights, phone directory, fire extinguisher, safety harness,
						safety boots, woollen safety gloves, cotton, helmet/head gear	
		Personal Strengths and Value Systems - Understand Entrepreneurship	<ul style="list-style-type: none"> <li>Understand motivation with the help of Maslow's Hierarchy of Needs</li> <li>List the characteristics of entrepreneurs with achievement motivation</li> <li>Describe the importance of honesty in entrepreneurs</li> <li>List the characteristics of highly creative and innovative people</li> </ul>	-	Classroom lecture/ PPT, Question and Answer/ Group Discussion/ Practice session	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, pamphlets, leaflets, models and cut-diagrams on Maslow's Hierarchy of Needs	P: 1:00
		Personal Strengths and Value Systems - Positive Attitude and Time Management	<ul style="list-style-type: none"> <li>Discuss how to maintain a positive attitude</li> <li>Discuss the role of attitude in self-analysis</li> <li>List your strengths and weaknesses</li> <li>Discuss the benefits of time management</li> <li>List the traits of effective time managers</li> <li>Apply effective time management techniques</li> <li>Apply tips for anger management and stress management</li> </ul>		Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Group Discussion/ Roleplay	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, pamphlets, leaflets on	T: 2:00 P: 1:00

						anger management, activity on strengths and weaknesses	
	Digital Literacy: A Recap - Computer Terminologies	<ul style="list-style-type: none"> <li>Identify the basic parts of a computer and keyboard</li> <li>Explain basic computer terminology</li> <li>Identify the functions of basic computer keys</li> <li>Discuss the main applications of MS Office</li> <li>Discuss the benefits of Microsoft Outlook</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Group Discussion/ Practical Activities	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector, pamphlets, keyboard, mouse, MS Office software, CPU, Monitor	T: 1:00 P: 2:00	
	Digital Literacy: A Recap - E-commerce and Digital Transactions	<ul style="list-style-type: none"> <li>Identify the different types of e-commerce</li> <li>Explain the benefits of e-commerce for retailers and customers in India</li> <li>Describe how you will sell a product or service on an e-commerce platform</li> <li>Elaborate on the need for digital transactions</li> <li>Identify the modes of digital transactions</li> <li>Explain the uses of digital transactions</li> </ul>	-	PowerPoint Presentation/ Question and Answer/ Group Discussion/ Practical Activities	Computer/laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector, E-Wallet soft wares such as PayTM,	P: 1:00	
					SBI buddy, etc.		
	Money Matters – Ways to Save Money and Online Banking	<ul style="list-style-type: none"> <li>Recognise the importance and benefits of saving money</li> <li>Discuss the main types of bank accounts</li> <li>Illustrate the process of opening a bank account</li> <li>Discuss the uses of online banking</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Practical Activities/ Roleplay	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, Passport, driving license, Voter ID card, PAN card, Aadhaar card, sample KYC document, bank opening form (can be downloaded from the Internet)	T: 2:00 P: 1:00	
	Money Matters - Costs and Investments	<ul style="list-style-type: none"> <li>Differentiate between fixed and variable costs</li> <li>Describe the main types of investment options</li> <li>Identify the different types of insurance products and types of taxes</li> <li>Describe the main types of electronic funds transfers</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction	T: 2:00 P: 1:00	

					Practical Activities	booklets, projector, pamphlets on insurance products and taxes	
		Preparing for Employment and Self-Employment - Interview Preparation	<ul style="list-style-type: none"> <li>Follow the steps to prepare for an interview</li> <li>Create an Effective Resume</li> <li>Identify the most frequently asked interview questions</li> <li>Discuss how to answer the most frequently asked interview questions</li> <li>Identify basic workplace terminology</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Practical Activities/ Roleplay	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector, sample CVs, Mock interviews, role plays, role play briefs, FAQs, quiz on basic workplace technologies	T: 2:00 P: 4:00
		Entrepreneurship - Use Effective Communication Skills	<ul style="list-style-type: none"> <li>List the traits of an effective team</li> <li>Apply techniques of effective listening</li> <li>Apply techniques of effective speaking</li> <li>Solve problems by identifying important problem-solving traits</li> <li>Identify techniques of dealing effectively with failure</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Practical Activities/ Roleplay	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector	T: 1:30 P: 3:00
		Aspects related to	<ul style="list-style-type: none"> <li>Discuss the concept and significance of entrepreneurship and the characteristics of an entrepreneur</li> </ul>	-	Classroom lecture/		
		Entrepreneurship	<ul style="list-style-type: none"> <li>List the qualities of an effective leader and the benefits of effective leadership</li> <li>Follow the entrepreneurial process and explain the entrepreneurship ecosystem</li> <li>Recognise the purpose of the Make in India campaign</li> <li>Define the relationship between entrepreneurship and risk appetite and entrepreneurship and resilience</li> </ul>		PowerPoint Presentation/ Question and Answer/ Practical Activities/ SMART Goal Writing Activity / SWOT activity/ Group Activity	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector, pen and paper individual exercise, charts, coloured pens, poster making on the Entrepreneurship ecosystem	T: 2:00 P: 3:00
		Ways to Become Successful Entrepreneur	<ul style="list-style-type: none"> <li>Discuss how to identify new business opportunities within your business</li> <li>Describe the different types of entrepreneurs</li> <li>State the characteristics of entrepreneurs</li> <li>Recall entrepreneur success stories</li> <li>Identify key schemes to promote entrepreneurs</li> <li>Discuss the characteristics of a resilient entrepreneur</li> </ul>	-	Classroom lecture/ PowerPoint Presentation/ Question and Answer/ Practical Activities/ SMART Goal Writing Activity / SWOT activity/ Group Activity	Computer/ laptop, black/whiteboard, marker/chalk, duster, instruction booklets, projector, pen and paper individual exercise,	T: 1:00 P: 3:00
						charts, coloured pens, poster making on the Entrepreneurship ecosystem	
		<b>Total Duration</b>					40 Hrs

## Annexure II

### Assessment Criteria

#### CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Soil and Water Testing Lab Analyst	
Job Role	Soil & Water Testing Lab Analyst
Qualifications Pack	AGR/Q8103
Sector Skill Council	Agriculture Skill Council of India

Sl 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 center (as per assessment criteria below).
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria.
5	To pass the Qualification Pack , every trainee should score a minimum of 70% in aggregate.
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				
NOSs	Element	PCs	Total Mark (600)	Out of	Theory	Skills Practical	
<b>1. AGR/N8101 Adhere to Sanitation &amp; Safety guidelines of the Lab</b>	Understand basic design & layout of the Lab	PC1. understand the layout of the lab	100	8	3	5	
		PC2. get familiarized with the requirement & working of different rooms/chambers and equipments		3	1	2	
	Maintain personal hygiene & lab sanitation	PC3. ensure personal hygiene by using clean lab coat, gloves, face masks, goggles, etc. whenever required		5	2	3	
		PC4. avoid eating, smoking & drinking inside the lab		1	0	1	
		PC5. oversee lab cleaning activities and undertake fumigation as & when required		4	2	2	
		PC6. place reagents/ chemicals at their designated place alphabetically in accordance with their properties		4	2	2	
		PC7. check & disinfect all tools and equipments before operating them		5	2	3	
		PC8. discard contents of the container immediately after completion of an experiment		5	0	5	
		PC9. dispose-off chipped or broken glassware in specially marked containers		4	1	3	
		PC10. clean/wash all the glasswares manually or through automatic washing machine in potable water		5	2	3	
		PC11. dry & decontaminate the glassware		4	2	2	
		PC12. sterilize glasswares etc in hot air oven		4	1	3	
		PC13. clean & place all the tools & equipments at the designated places after use		3	1	2	
		PC14. follow work instructions for maintaining required lab environment		2	1	1	
		Ensure safety at the lab		PC15. use personal protective equipments (PPEs)	4	2	2
				PC16. handle toxic chemicals with appropriate precaution	5	3	2

		PC17. remove spilled chemicals immediately		4	2	2
		PC18. dispose off chemicals, broken glass, flasks, pipettes etc in appropriate place		2	0	2
		PC19. follow the safety precautions provided by the manufacturer when operating instruments		8	4	4
		PC20. use the contents of first aid kit		6	3	3
		PC21. use fire extinguisher as & when required		8	3	5
		PC22. perform all procedures and follow work instructions for controlling operational risks		6	3	3
		<b>Total of NOS-1</b>		<b>100</b>	<b>40</b>	<b>60</b>
<b>2. AGR/N8108</b> <b>Conduct Soil Physical &amp; Chemical Analysis</b>	Soil Physical Analysis	PC1. determine soil texture- International Pipette method (mechanical analysis)	100	10	3	7
		PC2. determine soil moisture percentage (water holding capacity)		10	3	7
		PC3. determine bulk density- Weighing bottle method, Clod Method, Core Method		10	3	7
		PC4. determine hydraulic conductivity of soil- Constant head method, Falling head method		10	3	7
		PC5. determine soil moisture content- Gravimetric method, Infrared moisture meter method		10	3	7
	Soil Chemical Analysis	PC6. determine soil pH		10	3	7
		PC7. determine EC		10	3	7
		PC8. determine Organic Carbon-Walkley & Black Method, UV spectrophotometer method		10	3	7
		PC9. determine Calcium Carbonate (CaCO <sub>3</sub> ) free lime- Acid neutralisation & Schrotus Apparatus method		10	3	7
		PC10. determine nitrogen-Alkaline Permanganate method, Kjeldahl Method		10	3	7
		PC11. determine phosphorus- Olsen's method		10	3	7
		PC12. determine potassium on Flame Photometer		10	3	7

		PC13. determine Sodium on Flame Photometer		10	3	7
		PC14. determine Calcium & Magnesium-EDTA Titrimetric method		10	3	7
		PC15. determine boron- Hot water method, Dilute Hydrochloric acid method		10	3	7
		PC16. determine Sulphur- Precipitation method, Turbidimetric method		10	3	7
		PC17. determine Zinc, Copper, Iron, Manganese- DTPA method (Atomic Absorption Spectroscopy)		10	3	7
		PC18. determine cation exchange capacity- Ammonium Saturation & Sodium Saturation method		10	3	7
		PC19. use mini-soil kits for analysis of macro & micronutrients		10	3	7
	Reclamation of problematic soil	PC20. determine gypsum requirement of soil		10	3	7
		<b>Total of NOS-2</b>		<b>200</b>	<b>60</b>	<b>140</b>
<b>3. AGR/N8109 Conduct Water Sample Analysis</b>	Water Sample Analysis	Pc1. determine water pH	100	10	4	6
		PC2. determine EC of water		10	3	7
		PC3. determine total dissolved solids		10	3	7
		PC4. determine total suspended solids		10	3	7
		PC5. determine Carbonates & Bicarbonates		10	3	7
		PC6. determine Calcium & Magnesium-EDTA Titrimetric Method		10	3	7
		PC7. determine Sodium on Flame Photometer		10	3	7
		PC8. determine potassium		10	3	7
		PC9. determine phosphorus		10	3	7
		PC10. determine nitrogen		10	3	7
		PC11. determine boron		10	3	7
		PC12. determine Chloride		10	3	7
		PC13. determine Sulphate on spectrophotometer		10	3	7
		<b>Total of NOS-3</b>		<b>130</b>	<b>40</b>	<b>90</b>

<b>4. AGR/N8110 Prepare Soil &amp; Water Health Card</b>	Calculation of requirement of different elements	PC1. calculate the quantity of elements present post conducting various chemical test	10	3	7
		PC2. interpret the analytical results- the units of measurement should reliably indicate if a nutrient is deficient, adequate or in excess (in some cases toxic to plants)	10	3	7
		PC3. calculate the nutrient required for soil fertility management	10	3	7
	Preparation of Soil & Water Health cards	PC4. recommend the fertilizer and Micronutrients doses (kg/Ha) based upon the soil & water test calibrated for field conditions considering different factors such as yield target, crop nutrient requirement, management of the crop, soil type, method of fertiliser application, etc.	20	5	15
		PC5. recommend the use of organic manure & green manure crops	10	3	7
		PC6. recommend any amendment (Gypsum/Pyrite/Lime), if required	10	3	7
		PC7. recommend integrated nutrient management practices to be adopted	15	5	10
		PC8. upload the Soil & Water Health card on the portal	5	2	3
		PC9. prepare Soil fertility map using GIS	10	3	7
	<b>Total of NOS-4</b>	<b>100</b>	<b>30</b>	<b>70</b>	
<b>5. AGR/N8111 Supervise &amp; Train Lab Assistant in Good Lab Practices</b>	Supervise the activities of the Lab Assistant	PC1. guide the Lab Assistant to adhere to safety & sanitation guidelines of the lab	10	5	5
		PC2. oversee the data entry work undertaken by the assistant	5	2	3
		PC3. oversee smooth execution of sample registration and timely dispatch of soil & water health card	5	2	3
	Train Lab Assistant in good lab practices	PC4. calibrate equipments in accordance with written instructions	10	5	5
		PC5. take observations post-experiment	5	2	3
		PC6. register EC readings according to temperature	5	2	3
		PC7. prepare 1000 ppm solutions of different elements	10	5	5
		PC8. prepare standard solutions	5	2	3

		PC9. upload the Soil & Water Health card on the portal	5	2	3
		PC10. communicate effectively with customers	5	2	3
		PC11. undertake good lab practices	5	1	4
		<b>Total of NOS-5</b>	<b>70</b>	<b>30</b>	<b>40</b>
		<b>Grand Total</b>	<b>600</b>	<b>200</b>	<b>400</b>

### 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, 40 marks are allotted for theory and 60 for skills practical.









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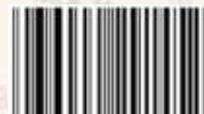
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