



Model Curriculum

QP Name: Soil & Water Testing Lab Analyst

QP Code: AGR/ Q8103

QP Version: 3.0

NSQF Level: 5

Model Curriculum Version: 2.0

Agriculture Skill Council of India || Agriculture Skill Council of India (ASCI), 6th Floor, GNG Tower, Plot No. 10, Sector -44

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Training Parameters

| | |
|---|--|
| Sector | Agriculture |
| Sub-Sector | Agriculture Industries |
| Occupation | Research and Development |
| Country | India |
| NSQF Level | 5 |
| Aligned to NCO/ISCO/ISIC Code | NCO-2015/2132.0300 |
| Minimum Educational Qualification and Experience | <p>Minimum Educational Qualification: Completed 2nd year of UG OR Pursuing 2nd year of UG and continuous education OR Completed 2nd year of diploma (after 12th) OR Pursuing 2nd year of 2-year diploma after 12th OR 12th pass with 1-year Vocational Education & training (NTC or NAC or CITS) OR Completed 3-year diploma after 10th with 1- year relevant experience OR 12th Grade pass with 2- year relevant experience OR 10th Grade pass with 4-year relevant experience OR Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass with 3-year relevant experience OR Previous relevant Qualification of NSQF Level 4.5 with 1.5- year relevant experience</p> |
| Pre-Requisite License or Training | Basic computer training |
| Minimum Job Entry Age | 21 Years |
| Last Reviewed On | 27-01-2022 |
| Next Review Date | 27-01-2025 |

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|--|------------|
| NSQC Approval Date | 27-01-2022 |
| QP Version | 3.0 |
| Model Curriculum Creation Date | 27-01-2022 |
| Model Curriculum Valid Up to Date | 27-01-2025 |
| Model Curriculum Version | 2.0 |
| Minimum Duration of the Course | 480 Hours |
| Maximum Duration of the Course | 480 Hours |

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Identify the basic design and layout of the lab
- Practice personal hygiene and lab sanitation guidelines
- Follow safety guidelines at the lab
- Perform physical analysis of soil samples
- Perform chemical analysis of soil samples
- Comprehend the plant nutrient composition through analysis
- Analyze nutrient composition of manures/composts
- Identify the reclamation requirement of problematic soils
- Analyze the Water Sample
- Calculate the amount of nutrients present/required for the soil
- Prepare and upload the Soil and Water Health Card based on sample analysis
- Supervise the activities of the Lab Assistant
- Train the Lab Assistant in good lab practices

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|--|-----------------|--------------------|--|--|----------------|
| Bridge Module | 05:00 | 05:00 | 0:00 | 0:00 | 10:00 |
| Module 1: Introduction to the role of a Soil & Water Testing Lab Analyst | 05:00 | 05:00 | 0:00 | 0:00 | 10:00 |
| AGR/N8101: Adhere to sanitation and safety guidelines of the lab | 10:00 | 10:00 | 0:00 | 00:00 | 20:00 |
| NOS Version No. 2.0 | | | | | |
| NSQF Level 4 | | | | | |
| Module 2: Hygiene and cleanliness | 03:00 | 03:00 | 0:00 | 0:00 | 06:00 |
| Module 3: Lab sanitation | 04:00 | 04:00 | 0:00 | 0:00 | 08:00 |

| | | | | | |
|--|--------------|---------------|-------------|--------------|---------------|
| Module 4: Lab Safety | 03:00 | 03:00 | 0:00 | 0:00 | 16:00 |
| AGR/N8108: Conduct physical & chemical analysis of soil, plants and manure/compost NOS Version No. 2.0 NSQF Level 5 | 30:00 | 120:00 | 0:00 | 00:00 | 150:00 |
| Module 5: Physical Analysis of soil samples | 05:00 | 30:00 | 0:00 | 00:00 | 35:00 |
| Module 6: Chemical Analysis of soil samples | 05:00 | 40:00 | 0:00 | 00:00 | 45:00 |
| Module 7: Reclamation of problematic soils | 05:00 | 20:00 | 0:00 | 00:00 | 25:00 |
| Module 8: Analysis of the plant nutrient composition | 05:00 | 15:00 | 0:00 | 00:00 | 20:00 |
| Module 9: Analysis of nutrient composition of manures/composts | 05:00 | 15:00 | 0:00 | 00:00 | 20:00 |
| AGR/N8109: Conduct water sample analysis NOS Version No. 2.0 NSQF Level 5 | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |
| Module 10: Analysis of the water sample | 10:00 | 20:00 | 0:00 | 0:00 | 30:00 |
| AGR/N8110: Ensure preparation and distribution of the Soil and Water Health Card NOS Version No. 2.0 NSQF Level 5 | 20:00 | 10:00 | 0:00 | 0:00 | 30:00 |
| Module 11: Calculation of the amount of nutrients present/required in soil/water sample | 16:00 | 08:00 | 0:00 | 0:00 | 24:00 |
| Module 12: Preparation of the Soil and Water Health Card | 04:00 | 02:00 | 0:00 | 0:00 | 06:00 |
| AGR/N8111: Supervise and train the Lab assistant in good lab practices NOS Version No. 2.0 NSQF Level 5 | 15:00 | 15:00 | 0:00 | 00:00 | 30:00 |
| Module 13: Supervision and Training of the Lab Assistant in good lab practices | 05:00 | 03:00 | 0:00 | 00:00 | 08:00 |
| Module 14: Soft Skills & Computer Skills | 10:00 | 12:00 | 0:00 | 00:00 | 22:00 |

| | | | | | |
|--|---------------|---------------|-------------|--------------|---------------|
| DGT/VSQ/N0103 Employability Skills NOS Version-1.0 NSQF Level-5 | 90:00 | 00:00 | 0:00 | 0:00 | 90:00 |
| Module 15: Employability Skills | 90:00 | 00:00 | 0:00 | 0:00 | 90:00 |
| Total Duration | 180:00 | 180:00 | 0:00 | 00:00 | 360:00 |

OJT: 120 hours

Module Details

Module 1: Introduction to the role of a Soil & Water Testing Lab Analyst

Bridge Module

Terminal Outcomes:

- Describe the importance of soil & water testing in improving agricultural productivity.
- List the key responsibilities of a Soil & Water Testing Lab Analyst and their career Progression

| Duration: 05:00 | Duration: 05:00 |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe different types of soil-properties, classification, texture, etc. • Describe the water sources used for irrigation purpose • Explain the importance of soil & water quality for enhancing the farm productivity • Describe the basic analysis procedures to be undertaken in the Soil & Water Testing Lab. • Explain the responsibilities and duties of a Soil & Water Testing Lab Analyst • Explain the safety precautions to be taken for the use of chemicals and equipment used in lab. • Explain the importance of manure and quality composition for field. • Explain the roles and procedure of the equipments in the lab | <ul style="list-style-type: none"> • Identify different types of soils • Identify chemicals/reagents required for conducting various soil physical and chemical tests. • Identify the different types of manure and uses |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different soil samples, Different water samples with impurities & contaminants, Different types of manures samples | |

Module 2: Hygiene and cleanliness

Mapped to NOS AGR/N8101 v 2.0

Terminal Outcomes:

- Discuss how to adhere to personal hygiene practices
- Demonstrate ways to ensure cleanliness around the workplace

| Duration: 03:00 | Duration: 03:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the requirements of personal health, hygiene and fitness at work. • Describe common health related guidelines laid down by the organizations/ Government at the workplace • Explain the importance of good housekeeping at the workplace. • List the work instructions for maintaining the required lab environment • Explain the importance of informing the designated authority on personal health issues related to injuries and infectious diseases. • Explain basic emergency and first aid procedure • Discuss the importance of Personal Protective Equipment • Explain the good lab practices • Explain the methods of lab cleaning and mopping • Explain about waste management and methods of waste disposal | <ul style="list-style-type: none"> • Demonstrate personal hygiene practices to be followed at the workplace. • Demonstrate the correct way of washing hands using soap and water, and alcohol-based hand rubs. • Demonstrate the steps to follow to put on and take off a mask safely. • Show how to sanitize and disinfect one's work area regularly. • Demonstrate adherence to the workplace sanitization norms. • Show how to ensure cleanliness of the work area. • Demonstrate segregation of waste |
| Classroom Aids: | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Personal Protective Equipment, cleaning equipment and materials, sanitizer, soap, mask | |

Module 3: Lab Sanitation

Mapped to NOS AGR/N8101 v 2.0

Terminal Outcomes:

- Explain the working of different chamber/rooms and equipment present in the lab.
- Describe the importance of lab sanitation and methods and techniques of cleaning the lab and equipment.
- Demonstrate waste management and safety precautions in the lab

| Duration: 04:00 | Duration: 04:00 |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the layout of the lab. • Describe the requirements and working of different chambers like Soil Sample Process room, Soil Store room, Physical & Chemical analysis room, Instrument room. • Explain the uses of equipment, tools, etc. and their placement in the lab. • Describe the use of clean lab coat, gloves, face masks, goggles, etc. • Explain the things which should be strictly avoided inside the lab such as eating, smoking & drinking. • Explain the safety precautions to be undertaken before cleaning of the lab. • Describe the cleaning techniques for the equipment in the lab. • Describe the importance of segregating the waste as recyclable and non- recyclable. • Describe different methods of disposing waste. • Explain the impact of pollution on the environment and how recycling waste helps. • Describe the environmental benefits of conserving electricity at the workplace. • Discuss different chemicals, lab-wares, equipment and their use • List the disinfectants and fumigants used in the lab | <ul style="list-style-type: none"> • Sketch a rough layout of the lab with proper labels. • Identify different tools and equipment used in the lab. • Demonstrate the use of PPEs. • Identify cleaning tools used for the rooms/equipment. • Demonstrate the use of exhaust and fume hoods while using volatile compounds. • Show how to check the expiry date of the chemicals. • Classify different types of waste materials as recyclable and non-recyclable. • Demonstrate how to dispose of hazardous waste with safety precautions. • Show how to turn on and off the appliances and equipment in a proper manner. |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop , Charts and posters for the lab hygiene and sanitation | |
| Tools, Equipment and Other Requirements | |
| Different PPE kit materials like lab coat, gloves, face masks, goggles, Cleaning tools and equipment, Disinfectants/fumigants/chemicals | |

Module 4: Lab Safety

Mapped to NOS AGR/N8101 v 2.0

Terminal Outcomes:

- Describe the importance of following safety precautions at the workplace/lab.
- Describe the techniques to handle chemicals/reagents which can be hazardous in nature.

| Duration: 03:00 | Duration: 03:00 |
|---|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • List the PPE required at the workplace. • Describe the common reported hazards at the workplace. • Describe the hazards caused due to chemicals/pesticides/fumigants. • Describe the basic safety checks to be done before the operation of any equipment/machinery. • Describe hazard symbols / labels commonly used on the chemical bottles. • Describe the methods of safe handling of chemicals. • Describe the techniques to dispose of hazardous chemical/physical waste keeping in mind the safety of others present inside the lab. • Describe the common first aid procedures to be followed in case of emergencies. • State measures that can be taken to prevent accidents and damages at the workplace. • Explain the importance of reporting details of first aid administered, to the reporting officer/doctor, in accordance with workplace procedures • State common health and safety guidelines to be followed at the workplace. • Explain the operation and maintenance of various equipment of the lab | <ul style="list-style-type: none"> • Demonstrate the use of first aid kit and the materials present inside it and when to apply what. • Demonstrate how to operate a fire extinguisher. • Demonstrate the proper technique of pouring and mixing of chemicals/reagents and the chemistry behind reactions. • Display the correct way of donning, doffing and discarding PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Show how to sanitize the tools, equipment and machinery properly. • Demonstrate safe disposal of waste. • Demonstrate procedures for dealing with accidents, fires and emergencies. • Demonstrate emergency procedures to the given workplace requirements. • Demonstrate the use of emergency equipment in accordance with manufacturers' specifications and workplace requirements. • Prepare a list of relevant hotline/ emergency numbers. |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| First Aid kit ,Fire extinguisher, Chemicals and reagents such as Sulphuric Acid, Hydrochloric Acid, PPE kit, Glass-wares, broken and intact | |

Module 5: Physical Analysis of soil samples

Mapped to NOS AGR/N8108 v 2.0

Terminal Outcomes:

- Define different physical properties of soil.
- Analyse the physical properties of the soil samples.

| Duration: 05:00 | Duration: 30:00 |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain different physical properties of soil. • Describe the textural classification of soil through International Pipette method. • Describe Soil moisture content, bulk density, Water Holding Capacity & Permanent Wilting Point, and their importance and different method of estimating them. • Explain the Hydraulic Conductivity of soil and how to determine it through Constant Head method & Falling Head method. • Explain the Soil Moisture Content by Gravimetric method and Infrared Moisture method. • explain the nutrient composition in manure and methods to analyse it • Explain nutrient deficiency symptoms in plants • Explain how to handle the equipments during analysing the soil samples and to maintain it. | <ul style="list-style-type: none"> • Determine the texture of soil through the International Pipette method. • Determine the soil moisture content by Gravimetric and Infrared Moisture methods. • Determine the Water Holding Capacity of soil at field capacity & Permanent Wilting Point through pressure plate. • Determine the bulk density of soil through Weighing Bottle method, Clod method & Core method. • Determine the hydraulic conductivity of soil through the Constant Head and Falling Head methods. • Demonstrate the process of Gravimetric method and infrared moisture method |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different samples of soil, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Hot Air Oven, Trays/paper dish, Wooden pestle and mortar, Sieve, Pressure plate (chamber), Water column, Infrared equipment, Weighing scale, PPE kit | |

Module 6: Chemical Analysis of soil samples

Mapped to NOS AGR/N8108 v 2.0

Terminal Outcomes:

- Analyse the chemical properties of the soil samples.

| Duration: 05:00 | Duration: 40:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> Describe the method of preparing solutions of different strengths and conversion to molarity, molality and normality, and their standardization using a standard solution. Describe the process of calculating soil pH with use of litmus paper and pH meter. Describe the process of calculating soil EC through salt analysis. Explain the Walkley & Black Method and UV Spectrophotometer method to determine Organic Carbon in the soil sample. Explain the Alkaline Permanganate method and Kjeldahl method to find out Nitrogen present in the soil. Describe Acid Neutralization & Schrotus Apparatus method to calculate Calcium carbonate (CaCO₃) in the soil sample. Describe Olsen's /Bray's Method to determine Phosphorus in the soil sample. Explain the importance of finding Potassium and Sodium through Flame Photometer. Explain the EDTA Titrimetric method of determining Calcium and Magnesium in the soil sample. Describe the Hot Water method to determine Boron. Describe the Precipitation method and Turbidimetric method to determine Sulphur. | <ul style="list-style-type: none"> Demonstrate the preparation of different solutions and their standardization. Show how to do proper labelling of the solutions prepared. Demonstrate the use of litmus paper and pH meter to determine the pH of the sample soil. Demonstrate how to calculate EC of the soil through salt analysis. Demonstrate Walkley & Black method and use of UV Spectrophotometer to find out Organic Carbon in the soil sample. Demonstrate Alkaline Permanganate method and Kjeldahl method to calculate Nitrogen. Demonstrate Olsen's Method to determine Phosphorus. Demonstrate the Flame Photometer experiment to find out Potassium and Sodium Demonstrate the Acid Neutralization reaction and Schrotus Apparatus method to determine Calcium carbonate (CaCO₃). Demonstrate EDTA Titrimetric method of determining Calcium & Magnesium. Demonstrate hot water method to determine boron Demonstrate the Precipitation method and Turbidimetric method to find out Sulphur quantity in soil sample. Demonstrate Atomic Absorption Spectroscopy or DTPA method to calculate Zinc, Copper, Iron & Manganese. Demonstrate Ammonium Saturation & |

| | |
|--|---|
| <ul style="list-style-type: none"> • Explain DTPA method (Atomic Absorption Spectroscopy) to determine • the amount of Zinc, Copper, Iron & Manganese. • Describe the Cation Exchange Capacity of soil through Ammonium Saturation & Sodium Saturation method. • Explain the importance and use of Mini-soil Kits for analysis of macro & micro-nutrients. | <p>Sodium Saturation method to determine Cation Exchange Capacity of the soil.</p> <ul style="list-style-type: none"> • Demonstrate the usage of Mini-soil kits for analyzing macro & micro-nutrients. |
| <p>Classroom Aids</p> | |
| <p>Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop</p> | |
| <p>Tools, Equipment and Other Requirements</p> | |
| <p>Different samples of soil, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Kjeldahl Apparatus, Hot Air Oven, Trays/paper dish, Wooden pestle and mortar, Sieve, Pressure plate (chamber), Soil pH meter, pH strips, Soil Salinity Meter, Turbidity Meter, COD Analyzer, Atomic Absorption Spectrophotometer, Weighing scale, Mini-soil kit, PPE kit</p> | |

Module 7: Reclamation of problematic soils

Mapped to NOS AGR/N8108 v 2.0

Terminal Outcomes:

- Analyse the reclamation requirement of problematic soils

| Duration: 05:00 | Duration: 20:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> Define Problematic soils, their types, location and reclamation measures. Describe various soil amendment measures to increase fertility and improve the physical and chemical attributes of the soil. Describe the importance of incorporating gypsum for the reclamation of alkali soil. Describe the importance of adding lime to acidic soils. Explain the remedial measures and management techniques for problematic soil | <ul style="list-style-type: none"> Determine gypsum requirement of the alkali soil for its reclamation. Determine the lime requirement of the acidic soil to rejuvenate them. Determine to reclamation of problematic soil in organic way |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different samples of problematic soils, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Trays/paper dish, Sieve, Weighing scale, PPE kit | |

Module 8: Analysis of the plant nutrient composition

Mapped to NOS AGR/N8108 v 2.0

Terminal Outcomes:

- Analyse the nutrient composition of the plant.

| Duration: 05:00 | Duration: 15:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> Explain the theoretical basis of plant sample collection. Explain nutrient requirement for each crop. Describe the process of calculating total Nitrogen in the plant sample by Micro-Kjeldahl method. Describe the process of calculating total Phosphorus by using Ammonium Molybdate-Vanadate solution. Explain the method of determining total Potassium by Flame Photometer and calculating it on Oven Dry basis. Describe Standard Curve method to determine total Sulfur in the plant sample. Explain Atomic Absorption Spectroscopy to determine the amount of Zinc, Copper, Iron & Manganese. Describe the Azomethine H method to find out the amount of Boron in plants. | <ul style="list-style-type: none"> Demonstrate the process of collection of plant samples, washing with dilute acid and drying in the oven, grinding in electric motor, sieving and storing them properly away from chemical fumes. Determine total Nitrogen in the plant sample by acid digester followed by distillation in Micro-Kjeldahl method. Demonstrate how to perform di acid or HF digestion of plant samples for the total Phosphorus by using Ammonium Molybdate-Vanadate and prepare the standard curve and P standards. Determine total Potassium by using the di acid plant digest using Flame Photometer and calculating it on Oven Dry Basis. Determine total Sulfur in the plant sample using di acid plant digest and prepare the sulphur standard curve. Demonstrate how Atomic Absorption Spectroscopy works to determine the amount of Zinc, Copper, Iron & Manganese from di acid digest. Demonstrate Azomethine H method to determine the amount of Boron in plants. |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different samples of plants, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Kjeldahl Apparatus, Hot Air Oven, Trays/paper dish, Porcelain pestle and mortar, Sieve, Atomic Absorption Spectrophotometer, Weighing scale, PPE kit | |

Module 9: Analysis of nutrient composition of manures/composts

Mapped to NOS AGR/N8108 v 2.0

Terminal Outcomes:

- Analyse the nutrient composition of the manure/compost samples to determine the quality of manure/compost

| Duration: 05:00 | Duration: 15:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> Describe the importance of manure and compost for soil and plant health. Describe the method of calculating moisture content or dry matter in the manure/compost sample. Explain the method of determining total NPK. Describe the standard methods and processes to determine secondary nutrients (Ca, Mg, S). Describe the importance of micro-nutrients (Zn, Cu, Fe, Mn & B) and how they are assessed in a manure/compost sample. Explain the method of determining C: N ratio and the importance of these two elements in manure/compost. Describe the physical properties such as pH and EC for the given manure/compost sample. | <ul style="list-style-type: none"> Demonstrate the process of determining moisture content or dry matter in the sample for assessing the effectiveness of manure/compost. Determine the total NPK present in the sample. Demonstrate the standard methods of calculating secondary nutrients (Ca, Mg, S) Determine micro-nutrients (Zn, Cu, Fe, Mn & B) in the given sample. Determine the C: N ratio by appropriate method in the manure/compost samples. Determine pH and EC of the manure/compost sample. |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different samples of manure/compost, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Appropriate equipment for the specified processes, Hot Air Oven, Trays/paper dish, Porcelain pestle and mortar, Sieve, Weighing scale, PPE kit | |

Module 10: Analysis of the water sample

Mapped to NOS AGR/N8109 v2.0

Terminal Outcomes:

- Explain the water quality indicators and the importance of water testing.
- Apply the principles of water testing for analysing the water sample

| Duration: 10:00 | Duration: 20:00 |
|---|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the process of determining pH of water through different methods. • Explain the method of determination of EC of water with the help of EC Meter. • Explain the significance of determining Total Dissolved Solids (TDS) in the water and how to calculate it. • Explain the method of determining Total Suspended Solids (TSS) in the water sample. • Explain the Water Hardness Index by calculating the amount of Carbonates & Bicarbonates. • Explain the calculation of Calcium and Magnesium by EDTA method. • Describe the determination of Sodium and Potassium amount present in the sample by Flame Photometer. • Explain the calculation of Phosphorus in irrigation water through applicable methods. • Describe the methods of calculating Nitrogen in the water samples. • Explain the process of calculation of Boron in the irrigation water samples • Explain the importance of finding out the types and amount of Chlorides present in the water sample and the methods through which it is done. • Describe the importance and method of determining the types and amount | <ul style="list-style-type: none"> • Demonstrate the method of determination of pH of water. • Determine the EC of water with the use of EC meter. • Demonstrate the method of calculation of Total Dissolved Solids (TDS) in a water sample. • Demonstrate the method of determination of Total Suspended Solids (TSS). • Demonstrate the method of calculation of carbonate and bicarbonate in water sample. • Assess the Water Hardness Index by calculating the quantity of Carbonates and Bicarbonates in the sample. • Calculate and classify the Residual Sodium Bicarbonate. • Demonstrate the EDTA method of determining Calcium and Magnesium. • Demonstrate the method of determining Sodium and Potassium through Flame Photometer. • Demonstrate the method of calculation of Phosphorus in the sample. • Demonstrate the method of calculation of Nitrogen in the water sample. • Assess the total amount of Boron in the water samples. • Identify the types of Chlorides and the process of analysing them in water samples. • Determine the types and amount of |

| | |
|---|---|
| <p>of Sulphates present in the water sample.</p> <ul style="list-style-type: none"> • Explain the fundamentals of water testing • Discuss the international atomic weights • Discuss EC readings according to the temperature • Explain good laboratory practices and avoid contamination of sample water • Describe instrument settings for flame photometer and atomic absorption spectroscopy | <p>Sulphates present in the sample.</p> <ul style="list-style-type: none"> • Demonstrate instrument settings for flame photometer and atomic absorption spectroscopy |
| <p>Classroom Aids</p> | |
| <p>Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop</p> | |
| <p>Tools, Equipment and Other Requirements</p> | |
| <p>Water samples from various irrigation sources, Chemicals/reagents, Volumetric Pipettes, Volumetric Burettes, Flasks & Beakers, Flame Photometer, pH Meter, EC Meter, PPE kit</p> | |

Module 11: Calculation of the amount of nutrients present/required in soil/water sample

Mapped to NOS AGR/N8110 v 2.0

Terminal Outcomes:

- Assess the amount of nutrients present in the given sample.
- Calculate the amount of nutrients and fertilizers required to increase the fertility of soil or quality of water.

| Duration: 16:00 | Duration: 08:00 |
|---|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Describe the formulae and methodology of calculating the quantity of nutrients present after conducting various chemical tests. • Explain the interpretation of analysed data with the help of computer software, soil fertility charts, indexes, etc. • Define the classification of soil test values of nutrients into low medium and high. • Describe the basics of soil fertility management and how to recommend nutrient doses for enhancing it. • Describe the importance of fertigation system and the nutrient formulations to be recommended for the same. • Outline the precautions to be taken in fertigation using sparingly and insoluble fertilizers. | <ul style="list-style-type: none"> • Calculate the amount of nutrients present in the sample. • Demonstrate how to feed the data into necessary software or to interpret it using the charts and indexes, etc. • Classify the soil test values of nutrients into low medium and high. • Calculate the amount of nutrients and fertilizers required for soil fertility management for different crops. • Demonstrate the techniques and practices to be followed for the soil fertility management. • Demonstrate how to incorporate different formulations of fertilizers and nutrients in fertigation systems for better utilization of resources. |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Different chemicals/reagents used in the lab, Required Software , Fertigation system, Fertilizers and nutrients, Soil Fertility Charts and Index | |

Module 12: Preparation of the Soil and Water Health Card

Mapped to NOS AGR/N8110 v2.0

Terminal Outcomes:

- Consolidate the test results and determine the fertility status of soil, the quality of water being used for irrigation and the quality of manure/compost being incorporated into the soil.
- Prepare and upload the Soil & Water Health Card on the online portal.

| Duration: 04:00 | Duration: 02:00 |
|--|--|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the recommendations to be provided in the Soil & Water Health Card post all the analysis which are precisely calibrated according to various parameters such as yield target, crop nutrient requirement, soil type, water hardness, etc. • Define the criteria and parameters to be undertaken for making recommendations to enhance the quality of soil and increase the productivity. • Explain the importance of using manures/compost and green crops as cover crops for increasing the quality of soil and increase the fertility. • Describe the amendments such as gypsum, pyrite and lime for the reclamation of problematic soils. • Explain the importance of Integrated Nutrient Management practices for better utilization of available resources and sustainable agriculture. • Explain the process of uploading all the processed data which have been collected post analysis of the samples and its importance for future referencing. • Describe the process and importance of uploading the Soil & Water health Card on the portal and the timely distribution of the same. • Explain the utility of GIS and | <ul style="list-style-type: none"> • demonstrate preparation of soil and water health cards based on the sample analysis • Demonstrate how to incorporate amendments such as gypsum, pyrite and lime to reclaim the problematic soils. • Demonstrate the model practices to be followed under Integrated Nutrient Management. • Demonstrate how to feed the processed data on the online portal using a computer/mobile phone. • Demonstrate how to upload a fully prepared Soil & Water Health Card on the portal using computer. • Demonstrate the usage of GIS software to create a Soil Fertility Chart from the processed data. • Practice to handle the data in computer • Prepare irrigation schedule as per the land and crop requirement and water management • Interpret soil analysis and specific land qualities for preparation of Soil Health card • Interpret water analysis and specific water body qualities for preparation of Water Health card |

| | |
|---|--|
| <p>importance of creating a Soil Fertility Map for a location.</p> <ul style="list-style-type: none"> • Discuss the importance and information provided in the soil card • Explain the Soil Health Management - concepts, goals and methods • Explain the criteria of essential nutrients and deficiency symptoms of nutrients in plants | |
| <p>Classroom Aids</p> | |
| <p>Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop</p> | |
| <p>Tools, Equipment and Other Requirements</p> | |
| <p>Processed data of different samples of soil, water, plant and manures/compost, Relevant software for uploading data, GIS Software, Internet</p> | |

Module 13: Supervision and Training of the Lab Assistant in good lab practices

Mapped to NOS AGR/N8111 v2.0

Terminal Outcomes:

- Explain the importance of training a Lab Assistant
- Demonstrate the use of different training aids to train the Lab Assistant

| Duration: 05:00 | Duration: 03:00 |
|---|--|
| Theory – Key Learning Outcomes <ul style="list-style-type: none"> • Describe the importance of overseeing of day to day lab activities. • Explain the effective methods of sharing and seeking information and feedback at the workplace. • Explain the procedure for completing work-related documentation. • Describe the process of mentoring an assistant at the workplace. • Describe the importance of guiding the assistant to follow safety and sanitation guidelines of the lab. • Explain the ways of monitoring the data entry work being done by the assistant. • Describe the methods and process of training the lab assistant to calibrate and optimize the equipment. • Explain the importance of taking all the readings and observations post experiment, correctly and timely. • Describe the ways to train the assistant in uploading data and Soil & Water Health Cards on the portal for future referencing. • Explain the importance of maintaining a healthy work relationship with co-workers, customers and seniors. • Explain how to assign work to lab assistant • Explain good lab practices • Discuss about safe lab operations Procedures • Know the repair and Maintenance of the equipment's in the lab | Practical – Key Learning Outcomes <ul style="list-style-type: none"> • Demonstrate requisite level of proficiency in verbal and non-verbal communication at the workplace across the gender and person with disability • Demonstrate the principles to be followed for training the lab assistant in good lab practices, maintaining a healthy work relationship with everyone, abiding by the rules & regulations of the lab, etc. • Demonstrate different approaches of training an assistant at the workplace. • Prepare a sample training schedule for an assistant. • Demonstrate the use of different training aids for effective training. • Demonstrate the method to prepare standard solution |
| Classroom Aids | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| Tools, Equipment and Other Requirements | |
| Workplace records and documents | |

Module 14: Soft Skills and Computer Skills

Bridge Module

Terminal Outcomes:

- Demonstrate the communication and digital literacy necessary for performing duties in Lab in an efficient manner.
- Explain personal strengths and value systems for the business operations
- Discuss the essentials of matters pertaining to finance
- Discuss necessary preparation for employment and self-employment
- Demonstrate the basics of entrepreneurship and identify new business opportunities

| Duration: 10:00 | Duration: 12:00 |
|--|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| <ul style="list-style-type: none"> • Explain the importance of verbal and non-verbal communication at the workplace. • Explain the importance of inclusion of all genders and People with Disability (PwD) at the workplace. • Explain gender concepts (gender as a social construct, gender sensitivity, gender equality etc.), issues and applicable legislation. • Define the need for appropriate verbal and non-verbal communication while interacting with all genders and PwD. • Explain the applicable PwD related regulations. • Discuss organization skills- decision making, team management, goal setting, multitasking, etc. • Explain basic computer skills including data entry, photocopying, printing, record maintenance and other associated work in MS Office. • List the different payment modes including UPI, e-wallets, etc • Discuss personal strengths and value systems at work place for the business like safe work habits, achievement motivation, time management, anger management, stress management etc. • Recall important tenets of digital literacy viz. fundamentals of computer terminology, parts of a computer and a keyboard, main | <ul style="list-style-type: none"> • Show how to do SWOT analysis of personal strengths and workplace required value systems • Demonstrate requisite level of proficiency in verbal and non-verbal communication at the workplace. • List the qualities of an effective leader and the benefits of effective leadership • Demonstrate appropriate verbal and non-verbal communication that is respectful of genders and disability. • Show how to use digital payment modes viz. NEFT, RTGS, UPI wallet, internet banking, etc. • Demonstrate the parts, utility and importance of various electronic tools and equipment’s necessary for lab operations • Identify techniques of dealing effectively with failure • Demonstrate use of various software for record keeping and data management |

| | |
|--|--|
| <p>applications of MS Office and related electronic system of data management and record keeping</p> <ul style="list-style-type: none"> • Discuss the essentials of matters pertaining to financials like saving money, bank accounts, types of costs, investment options, insurance products, taxes etc. • Discuss how to prepare for employment and self-employment like preparing for an interview, effective resume writing, basic workplace terminology etc. • Discuss the basics of entrepreneurship and identify new business opportunities viz effective leadership, effective speaking, effective listening, problem solving, business opportunities, types of entrepreneurs, entrepreneurial process and ecosystem, resilient entrepreneurs | |
| <p>Classroom Aids:</p> | |
| <p>Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop ,Charts and videos on workplace communication.</p> | |
| <p>Tools, Equipment and Other Requirements</p> | |
| <p>Mobile phone with digital payment applications installed.</p> | |

Module 15: On-the-Job Training

Mapped to QP AGR/Q8103 v2.0

| | |
|--|------------------------------------|
| Mandatory Duration: 120:00 | Recommended Duration: 00:00 |
| Location: On Site | |
| Terminal Outcomes | |
| <ul style="list-style-type: none"> • Demonstrate how to maintain personal hygiene and undertake sanitation and safety measures in the Lab • Show how to perform physical and chemical analysis of soil, plants and manures/compost sample • Demonstrate how to test and analyze water sample • Demonstrate preparation, upload and distribution of the Soil and Water Health Card • Show how to supervise Lab Assistant and communicate effectively at workplace • Demonstrate necessary digital skills for the lab operations | |

Module 16: Employability Skills (90 hours)

Mapped to NOS DGT/VSQ/N0103 v1.0

Duration: 90:00

Key Learning Outcomes

Introduction to Employability Skills Duration: 3 Hours

After completing this programme, participants will be able to:

1. Outline the importance of Employability Skills for the current job market and future of work
2. List different learning and employability related GOI and private portals and their usage
3. Research and prepare a note on different industries, trends, required skills and the available opportunities

Constitutional values - Citizenship Duration: 1.5 Hours

4. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
5. Demonstrate how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 5 Hours

6. Discuss relevant 21st century skills required for employment
7. Highlight the importance of practicing 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life
8. Create a pathway for adopting a continuous learning mindset for personal and professional development

Basic English Skills Duration: 10 Hours

9. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
10. Read and understand text written in basic English
11. Write a short note/paragraph / letter/e -mail using correct basic English

Career Development & Goal Setting Duration: 4 Hours

12. Create a career development plan
13. Identify well-defined short- and long-term goals

Communication Skills Duration: 10 Hours

14. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette
15. Write a brief note/paragraph on a familiar topic
16. Explain the importance of communication etiquette including active listening for effective communication
17. Role play a situation on how to work collaboratively with others in a team

Diversity and Inclusion Duration: 2.5 Hours

18. Demonstrate how to behave, communicate, and conduct appropriately with all genders and PwD
19. Discuss the significance of escalating sexual harassment issues as per POSH act

Financial and Legal Literacy Duration: 10 Hours

20. Discuss various financial institutions, products, and services
21. Demonstrate how to conduct offline and online financial transactions, safely and securely and check passbook/statement
22. Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions
23. Calculate income and expenditure for budgeting
24. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 20 Hours

25. Describe the role of digital technology in day-to-day life and the workplace
26. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
27. Demonstrate how to connect devices securely to internet using different means
28. Follow the dos and don'ts of cyber security to protect against cyber crimes
29. Discuss the significance of displaying responsible online behavior while using various social media platforms
30. Create an e-mail id and follow e-mail etiquette to exchange e-mails
31. Show how to create documents, spreadsheets and presentations using appropriate applications
32. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

33. Explain the types of entrepreneurship and enterprises
34. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
35. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
36. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 9 Hours

37. Classify different types of customers
38. Demonstrate how to identify customer needs and respond to them in a professional manner
39. Discuss various tools used to collect customer feedback
40. Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for apprenticeship & Jobs Duration: 8 Hours

41. Draft a professional Curriculum Vitae (CV)
42. Use various offline and online job search sources to find and apply for jobs
43. Discuss the significance of maintaining hygiene and dressing appropriately for an interview
44. Role play a mock interview
45. List the steps for searching and registering for apprenticeship opportunities

Annexure

Trainer Requirements

| Trainer Prerequisites | | | | | | |
|-----------------------------------|---|------------------------------|----------------------|---------------------|----------------|---|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| Graduate | Chemistry/Bio-Technology/Botany/Bio-Chemistry/ Environmental Science/Water Management/Soil & Water Management | 3 | Soil & Water Testing | 0 | | For school Program minimum qualification of Trainer should be Graduate(Chemistry/Bio-Technology/Botany/Bio-Chemistry) with minimum 3 years Teaching experience (will be considered industry experience) |
| Graduate | Agriculture/Horticulture | 2 | Soil & Water Testing | 0 | | |
| Post Graduate | Agriculture/ Soil Science /Agriculture Chemistry/ Soil and Water Management/ Soil and Water Conservation/ Soil and Water Conservation Engineering/Environmental Science | 1 | Soil & Water Testing | | | |

| Trainer Certification | |
|--|---|
| Domain Certification | Platform Certification |
| Certified for Job Role “ Soil & Water Testing Lab Analyst ”, mapped to QP: “AGR/Q8103, v3.0”, Minimum accepted score is 80% | Recommended that the Trainer is certified for the Job Role: “Trainer (vets and skills)”, mapped to the Qualification Pack: “MEP/Q2601, v2.0”. The minimum accepted score as per MEPS guidelines is 80%. |

Assessor Requirements

| Assessor Prerequisites | | | | | | |
|-----------------------------------|---|------------------------------|---|--------------------------------|----------------|--|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training/Assessment Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| Graduation | B. Sc (Biochemistry/Chemistry/ Agricultural Chemistry/Environmental Science/Water Management/Soil & Water Management) | 5 | In Geoscience/Soil Science/ Soil conservation & Water Resource Management | 0 | | Practical skills and knowledge required in soil and water related field work, such as analysing soil fertility, nutritional status and Water Resource management |
| Graduation | B. Sc (Agriculture/Horticulture) | 5 | In Geoscience/Soil Science/ Soil conservation & Water Resource Management | 0 | | Practical skills and knowledge required in soil and water related field work, such as analysing soil fertility, nutritional status and Water Resource management |
| Graduation | B. Tech (Soil & Water Conservation Engineering) | 4 | In Geoscience/Soil Science/ Soil conservation & Water Resource Management | 0 | | Practical skills and knowledge required in soil and water related field work, such as analysing soil fertility, nutritional status and Water Resource management |

| | | | | | |
|-----------------|---|---|---|---|--|
| Post-Graduation | M.sc/M.Tech (Agriculture/ Soil Science /Agriculture Chemistry/ Soil and Water Management/ Soil and Water Conservation/ Soil and Water Conservation Engineering/Environmental Science and other related streams) | 2 | In Geoscience/Soil Science/ Soil conservation & Water Resource Management | 0 | Practical skills and knowledge required in soil and water related field work, such as analysing soil fertility, nutritional status and Water Resource management |
| PhD | Agriculture Chemistry/Agriculture/Biochemistry/Agriculture Chemistry & Soil Science | 1 | In Geoscience/Soil Science/ Soil conservation & Water Resource Management | | Practical skills and knowledge required in soil and water related field work, such as analysing soil fertility, nutritional status and Water Resource management |

Assessor Certification

| Domain Certification | Platform Certification |
|--|---|
| Certified for Job Role “ Soil & Water Testing Lab Analyst ”, mapped to QP: “AGR/Q8103, v3.0”, Minimum accepted score is 80% | Certified for the Job Role: “Assessor (vets and skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0”, with a minimum score of 80%. |

Assessment Strategy

Assessment System Overview

In Agriculture Sector it is of ultimate importance that individuals dealing with crop production or livestock have the requisite knowledge and competencies to undertake the task. Based on the Assessment Criteria, SSC in association with empaneled AAs, define the test structure for the given job roles to cover the required skills and competencies. Assessment strategy consists of the following:

1. Multiple Choice Questions: To assess basic knowledge (Objective/Subjective)
2. Viva: To assess awareness on processes (Oral and/or written questioning)
3. Practical: To evaluate skills and identify competencies. (Observation)

Assessments for knowledge and awareness on processes may be conducted through ‘real-time’ internet-based evaluation or by conducting the same ‘offline’ through TABs. Skills and competencies are to be assessed by conducting ‘practical’ on the ground through qualified and ToA certified assessors.

An individual must have adequate knowledge and skills to perform a specific task, weightage for different aspects of the assessment is given as follows:

- Multiple Choice Questions: 20%-30%, depending on the specific QP
- Viva: 20%
- Practical: 50% - 60% (Involves demonstrations of applications and presentations of procedures/tasks and other components)
- Assessment will be carried out by certified assessors through empanelled assessment partners. Based on the results of the assessment; ASCI will certify the learners/candidates

Testing Environment

Assessments are conducted on laptops, Mobiles and android tablets via both offline and online mode depending on the internet connectivity at the assessment location.

In remote locations/villages, assessments get delivered through tablets without the requirement of the Internet.

- Multilingual assessments (ASCI is conducting the assessments in 13 + languages pan India)
- Rubric driven assessments in Practical/Viva sections and responses recorded accordingly
- All responses, data, records and feedback stored digitally on the cloud
- Advanced auto-proctoring features – photographs, time-stamp, geographic-tagging, toggle- screen/copy-paste disabled, etc.
- Android-based monitoring system
- End to end process from allocation of a batch to final result upload, there is no

manual intervention

- Assessment will normally be fixed for a day after the end date of the training / within 7 days of completion of training.
- Assessment will be conducted at the training venue
- The room where assessment is conducted will be set with proper seating arrangements with enough space to curb copying or other unethical activities
- Question bank of theory and practice will be prepared by ASCI /assessment agency and approved ASCI. Only from approved Question Bank assessment agency will prepare the question paper. Theory testing will include multiple-choice questions, pictorial questions, etc. which will test the trainee on his theoretical knowledge of the subject.
- The theory, practical and viva assessments will be carried out on the same day. In case of a greater number of candidates, the number of assessors and venue facilitation be increased and facilitated

| Assessment | | | |
|------------------------|-------------------------------|--------------------------------|--|
| Assessment Type | Formative or Summative | Strategies | Examples |
| Theory | Summative | MCQ/Written exam | Knowledge of facts related to the job role and functions. Understanding of principles and concepts related to the job role and functions |
| Practical | Summative | Structured tasks/Demonstration | Practical application /Demonstration /Application tasks |
| Viva | Summative | Questioning and Probing | Mock interviews on the usability of job roles/advantages /importance of adherence to procedures. Viva will be used to gauge trainee's confidence and correct knowledge in handling the job situation |

The question paper pre-loaded in the computer /Tablet and it will be in the language as requested by the training partner.

Assessment Quality Assurance framework

Assessment Framework and Design:

Based on the Assessment Criteria, SSC in association with AAs will define the test structure for the given roles to cover the required skills and competencies. ASCI offer a bouquet of tools for multi-dimensional evaluation of candidates covering language, cognitive skills, behavioural traits and domain knowledge.

Theoretical Knowledge - Item constructs and types are determined by a theoretical understanding of the testing objectives and published research about the item types and constructs that have shown statistical validity towards measuring the construct. Test item types that have been reported to be coachable are not included. Based on these, items are developed by domain experts. They are provided with comprehensive guidelines of the testing objectives of each question and other quality measures.

Type – Questions based on Knowledge Required, Case-based practical scenario questions and automated simulation-based questions.

Practical Skills - The practical assessments are developed taking into consideration two aspects: what practical tasks is the candidate expected to perform on the job and what aspects of the job cannot be judged through theoretical assessments. The candidates shall be asked to perform either an entire task or a set of subtasks depending on the nature of the job role

Type – Standardized rubrics for evaluation against a set of tasks in a demo/practical task

Viva Voce - Those practical tasks which cannot be performed due to time or resource constraints are evaluated through the viva mode. Practical tasks are backed up with Viva for thorough assessment and complete evaluation

Type – Procedural questions, dos and don'ts, subjective questions to check the understanding of practical tasks.

The assessor has to go through an orientation program organized by the Assessment Agency. The training would give an overview to the assessors on the overall framework of QP evaluation. The assessor shall be given a NOS and PC level overview of each QP as applicable. The overall structure of assessment and objectivity of the marking scheme will be explained to them. The giving of marks will be driven by an objective framework that will maintain the standardization of the marking scheme.

Type of Evidence and Evidence Gathering Protocol:

During the assessment the evidence collected by AAs and ASCI are:

- GeoTagging to track ongoing assessment
- AA's coordinator emails the list of documents and evidence (photos and videos) to the assessor one day before the assessment. The list is mentioned below:
 - Signed Attendance sheet
 - Assessor feedback sheet
 - Candidate feedback sheet

- Assessment checklist for assessor
- Candidate Aadhar/ID card verification
- Pictures of the classroom, labs to check the availability of adequate equipment's and tool to conduct the training and assessment
- Pictures and videos of Assessment, training feedback and infrastructure.
- Apart from the Assessor, a Technical assistant is popularly known as Proctor also ensures the proper documentation and they verify each other's tasks.
- To validate their work on the day of the assessment, regular calls and video calls are done.
- On-boarding and training of assessor and proctor is done on a timely basis to ensure that the quality of the assessment should be maintained.
- Training covers the understanding of QP, NSQF level, NOS and assessment structure

Methods of Validation

- Morning Check (Pre-Assessment): Backend team of AA calls and confirms assessor/technical SPOC event status. Assessor/Technical SPOC are instructed to reach the centre on time by 9:30 AM / as decided with TC and delay should be highlighted to the Training Partner in advance.
- Video Calls: Random video calls are made to the technical SPOC/assessor so as to keep a check on assessment quality and ensure assessment is carried out in a fair and transparent manner
- Aadhar verification of candidates
- Evening Check (Post Assessment): Calls are made to the ground team to ensure the event is over by what time and the documentation is done properly or not.
- TP Calling: To keep a check on malpractices, an independent audit team calls the TP on a recorded line to take confirmation if there was any malpractice activity observed in the assessment on part of the AA/SSC team. If calls are not connected, an email is sent to TP SPOC for taking their confirmation
- Video and Picture Evidence: Backend team collects video and pictures for assessment on a real-time basis and highlights any issue such as students sitting idle/ trainer helping the candidates during the assessment.
- Surprise Visit: Time to time SSC/AA Audit team can visit the assessment location and conduct a surprise audit for the assessment carried out by the ground team.
- Geo Tagging: On the day of the assessment, each technical SPOC is required to login into our internal app which is Geotagged. Any deviation with the centre address needs to be highlighted to the assessment team on a real-time basis.

Method for assessment documentation, archiving, and Access:

- ASCI have a fully automated result generation process in association with multiple AAs
- Theory, Practical and Viva marks form the basis of the results and encrypted files generated to avoid data manipulation. All responses were captured and stored in the

System with Time-Stamps at the end of AAs and SSC. NOS-wise and PC-wise scores can be generated.

- Maker Checker concept: One person prepares the results and another audit result which is internally approved by AA at first and then gets vetted at the end of SSC
- All softcopies of documents are received from the on-ground tech team over email. The same is downloaded by our internal backend team and saved in Repository. The repository consists of scheme-wise folders. These scheme-wise folders have two job role-specific folders. These specific folders have Year wise and Month wise folders where all documents are saved in Batch specific folders. All Hard copies are filed and stored in the storeroom.

Result Review & Recheck Mechanism –

- Time-stamped assessment logs
- Answer/Endorsement sheets for each candidate
- Attendance Sheet
- Feedback Forms: Assessor feedback form, Candidate feedback form, TP feedback form
- The results for each of the candidate shall be stored and available for review (retained for 5 years/ till the conclusion of the project or scheme)

References

Glossary

| Term | Description |
|------------------------------|---|
| Declarative Knowledge | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem. |
| Key Learning Outcome | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| OJT (M) | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site |
| OJT (R) | On-the-job training (Recommended); trainees are recommended the specified hours of training on site |
| Procedural Knowledge | Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills. |
| Training Outcome | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training. |
| Terminal Outcome | Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome. |

Acronyms and Abbreviations

| Term | Description |
|------|--|
| AGR | Agriculture |
| FYM | Farm Yard Manure |
| NOS | National Occupational Standard (s) |
| NSQF | National Skills Qualifications Framework |
| OJT | On-the-job Training |
| PwD | People with Disability |
| PPE | Personal Protective Equipment |
| QP | Qualifications Pack |