

Curriculum

For

“Pesticides & Fertilisers Technology”

(Assistant Technician)
(Level -2)



27th to 30th December 2021



**National Vocational & Technical
Training Commission**

Table of Contents

Introduction	3
Definition/ Description of the training programme	3
Purpose of the Training Programme	4
Overall Objectives of Training Programme	4
Competencies to Be Gained After Completion Of Course	5
Possible Available Job Opportunities Available Immediately and Later In The Future	5
Trainee Entry Level	5
Minimum Qualification of Trainer	5
Recommended Trainer: Trainee Ratio	6
Medium of Instruction i.e. Language of Instruction	6
Duration of the Course (Total Time, Theory & Practical Time)	7
Summary – Overview of the Curriculum	9
Modules	13
General assessment guidance for <i>Pesticides & Fertiliser Technology</i>	40
Complete List of Tools and Equipment	44
List of Consumable Supplies	44
Credit Values	47

Introduction

Definition/ Description of the training programme for *Pesticides & Fertilisers Technology*

Agriculture is considered the backbone of Pakistan's economy, which relies heavily on its major crops. Pakistan's agriculture sector plays a central role in the economy as it contributes 18.9 percent to GDP and absorbs 42.3 percent of labour force. It is also an important source of foreign exchange earnings and stimulates industrial growth by supplying byproducts. According to the 6th Population and Housing Census in Pakistan 2017, the country's population is growing at the rate of 2.4 percent per annum. This rapid increase in population is raising demand for agricultural products and services. The agricultural production is mainly depends upon the use of mineral Fertilisers and other inputs.

Pesticides and Fertilisers have extensive applications all around the globe including developed and developing countries. The economy and prosperity of the agro based economies mainly depends on the Fertilisers and Pesticides industries so they are considered as a vital component for modern farming. The demand for the use of Fertilisers and Pesticides is increasing day by day due to rapid increase in food demand. These industries help to create business, and jobs opportunities at the national and international levels.

Globally, efficient application of Fertilisers and Pesticides is crucial for agriculture sector. Developed countries have launched such a strategy that their agriculture sector is achieving its objective of increased yield. This happened due to the collaboration of industries with research and academia. Whereas, countries like Pakistan are allocating subsidies on Fertilisers and Pesticides, but are unable to achieve their objective of providing sufficient food to its people on reasonable prices. The main purpose of this course is to enable the student to play his/her vital role in country's economy through modern knowledge driven approach. In short, the main objective of this project is to equip the students with knowledge and skills so that they could be able to handle the issues related with rational use of inputs, minimize the economic cost and can help to enhance agricultural yield potential. The effort of new curriculum development by NAVTTC will help the agro industry of Pakistan to hire trained and skilled manpower that will contribute in the improvement of livelihood. It will also help to establish the link between industry, academia and farming community.

The “Fertilisers and Pesticides technicians” will be vigilant of the challenges that our economy is facing and the long term requirements of food supply. They should also aware of the latest tools and techniques that can be used to upgrade the agricultural sector of Pakistan.

Purpose of the Training Programme

The purpose of this qualification (set of four occupations) is to set professional standards for Fertilisers and Pesticides technicians and to train the unskilled workers (men and women) across the country. The skilled labors will serve as key elements to improve the Agriculture Industry. The agriculture sector is diversified and dynamic in nature. Upon successful completion of this course the trainees should be able to know the basic and specific objectives of these qualifications are as under:

- Improve the professional competence regarding Fertilisers and Pesticides industry
- Capacitate the local community and trainers in modern Competency Based Training (CBT)
- Provide flexible pathways and progressions in Fertilisers and Pesticides industry
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training in Fertilisers and Pesticides industry in Pakistan
- Understand the marketing mechanisms of Fertilisers and Pesticides products.
- Understand the issues related to agriculture industry
- Know the relevant industry stakeholders & their role

Overall Objectives of Training Programme

The primary objective of this training program is to provide the trainees with updated knowledge and skills required for Pesticides & Fertilisers technology to cope the challenges of the Pesticides & Fertilisers industry. After qualifying the course at different levels (Level 1 – 5), the students will be able to get job in the Pesticides & Fertilisers industry and also be able to perform as entrepreneurs. The contents of the course are specifically designed in such a way that it covers all the major Pesticides & Fertilisers aspects hence, the students are sufficiently exposed to operational requirements of this sector and are ready to perform their duties confidently.

The main objectives of this project are to:

- Improve the quality of training delivery and setting national benchmarks for training of agriculture technology (Level 1-5) at national level.
- Provide progressive and flexible learning environment for trainees.
- Provide basics for competency-based assessment.
- Establish a standardized and sustainable training system.

Competencies to Be Gained After Completion Of Course

- **A-** Comply with Work Health and Safety Policies
- **B-** Maintain Personal Health, hygiene and safety
- **C-** Perform basic communication skills
- **D-** Operate Computer Functions (General)
- **E-** Perform Soil Sampling
- **F-** Diagnose Plant health problems
- **G-** Perform Pesticides Pre-Application Tasks
- **H-** Apply Fertiliser

Possible Available Job Opportunities Available Immediately and Later In The Future

- Assistant Technician (Pesticides & Fertiliser)
- Assistant Technician (Pesticides)
- Assistant Technician (Fertiliser)
- Fertiliser Spray Assistant Technician
- Pesticides Spray Assistant Technician
- Assistant Gardener

Trainee Entry Level

For National Vocational Certificate Level-2 in Pesticides & Fertilisers Technician, the entry requirement is Matriculation or equivalent to Matriculation.

Minimum Qualification of Trainer

2-5 years of professional experience in Agriculture industry/ DAE/Level 5 (Pesticides & Fertilisers Technology)/ Bachelors degree in Agriculture Sciences

Recommended Trainer: Trainee Ratio

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 25 trainees.

Medium of Instruction i.e. Language of Instruction

Instruction will be Urdu, English or Regional Language.

Duration of the Course (Total Time, Theory & Practical Time)

This curriculum comprises 09 modules. The recommended delivery time is 600 hours. Delivery of the course could therefore be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

Module	Theory ¹ Days/hours	Workplace ² Days/hours	Total hours
Module 1: Comply with Work Health and Safety Policies	20	10	30
Module 2: Maintain Personal Health, Hygiene and Safety	20	10	30
Module 3: Perform Basic Communication Skills	20	10	30
Module 4: Operate Computer Functions (General)	10	20	30
Module 5: Perform Soil Sampling	20	90	110
Module 6: Diagnose Plant Health Problems	30	90	120
Module 7: Perform Pesticides Pre-Application Tasks	40	90	130
Module 8: Apply Fertiliser	30	90	120

¹ Learning Module hours in training provider premises

² Training workshop, laboratory and on-the-job workplace

Summary of Competency Standards

The proposed curriculum is composed of 23 cores along with generic modules that will be covered in 3600 hrs. It is proposed that the course will be delivered in three years period (Level 1-5). The distribution of contact hours (practical & theory) is given below:

- **Theory:** (20%) **Practical** (80%)
- **Theory:** 190hours **Practical:** 410 hours

Sequence of the Modules

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial needs of Pakistan.

The distribution table is shown below:

Assistant Technician - 6 Months		
Module 1: Comply with Work Health and Safety Policies 30 Hours		Module 4: Operate Computer Functions (General) 30 Hours
Module 2: Maintain Personal Health, Hygiene and Safety 30 Hours		
Module 5: Perform Soil Sampling 110 Hours	Module 6: Diagnose Plant health problems 120 Hours	
Module 7: Perform Pesticides Pre-Application Tasks 130 Hours	Module 8: Apply Fertiliser 120 Hours	
Module 3: Perform Basic Communication Skills 30 Hours		

Summary – Overview of the Curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: Comply with Work Health and Safety Policies Aim: After successful completion of this module, the trainee is competent in Complying with Work Health and Safety Policies	LU1: Work safely at work place LU2: Communicate work health and safety (WHS) assess at work place LU3: Minimize risks to personal safety at work place LU4: Minimize risks to public safety	20	10	30
Module 2: Maintain Personal Health, Hygiene and Safety Guidelines Aim: After successful completion of this module, the trainee is competent in maintaining Personal Health, Hygiene and Safety	LU1: Identify Hazards at Workplace LU2: Apply Personal Protective and Safety Equipment (PPE) LU3: Observe Occupational Safety and Health (OSH) LU4: Dispose of hazardous Waste/materials	20	10	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 3: Perform Basic Communication Skills Aim: After successful completion of this module, the trainee is competent in Performing Basic Communication Skills	LU1: Work in Team LU2: Follow Supervisor's instructions LU3: Demonstrate Basic IT Skills	20	10	30
Module 4: Operate Computer Functions (General) Aim: After successful completion of this module, the trainee is competent in Operating Computer Functions (General)	LU1: Set up the computer for use LU2: Organize files in folder LU3: Shut down computer system	10	20	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 5: Perform Soil Sampling for Lab Test Aim: After successful completion of this module, the trainee is competent in performing Soil Sampling for Lab Test	LU1: Identify soil area for sampling LU2: Collect soil sample for analysis LU3: Transport soil sample to the lab for analysis	20	90	110
Module 6: Diagnose Plant health problems Aim: After successful completion of this module, the trainee is competent in diagnosing Plant health problems	LU1: Identify Plant Symptoms LU2: Collect plant sample for analysis LU3: Dispatch Plant sample to the lab for analysis	20	100	120

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 7: Perform Pesticides Pre-Application Tasks Aim: After successful completion of this module, the trainee is competent in performing Pesticides Pre-Application Tasks	LU1: Perform Pest Scouting LU2: Collect Pest for Identification	40	110	130
Module 8: Apply Fertiliser Aim: After successful completion of this module, the trainee is competent in applying Fertiliser	LU1: Identify different Fertilisers LU2: Apply Fertiliser	20	100	120

Modules

Module 1: Comply with Work Health and Safety Policies

Objective of the module: After completing this module, the learner will be able to apply general work health and safety requirements at the workplace. Communicate work and health safety assess at work place. It describes generic work health and safety responsibilities applicable to employees without managerial or supervisory responsibilities.

Duration: 30 hours **Theory:** 20 hours **Practical:** 10 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Work safely at work place	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify relevant organizational safety policies and procedures 2. Categorize tools and equipment as per requirements 3. Maintain tools and equipment 4. Follow established safety procedures during work activities 5. Identify existing or potential safety issues to designated persons 	<ul style="list-style-type: none"> • Follow the basic guidelines of the safety policies • Enlist tools and equipment used for safety purpose • Describe the maintenance procedure • Display safety guideline charts 	Total: 8hrs Theory: 6hrs Practical: 2hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

	<p>6. Report work-related incidents and accidents to supervisor</p> <p>7. Take necessary measures to minimizing risks</p>				
<p>LU2: Communicate work health and safety (WHS) assess at work place</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Raise work health and safety issues with supervisor. 2. Contribute to workplace meetings and other consultative processes for work health and safety management at the workplace 3. Make suggestions for improving work health and safety practices 4. Identify situations that may endanger the personal safety 5. Document the incident regarding personal safety at work place 	<ul style="list-style-type: none"> • Describe emergency procedures for health and safety • Describe procedures for fires, accidents and evacuation at work place • Follow guidelines for evacuation • Describe the essential elements of personal Health and Safety at Work place • Outline commonly used hazard signs and safety symbols of PPEs 	<p>Total: 6hrs Theory: 4hrs Practical: 2hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • PPEs (Safety glasses, Ear muffs/ear plugs, Protective Gloves, Cap, Safety shoes etc.) 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

	<ol style="list-style-type: none"> 6. Eliminate workplace hazards regarding personal safety 7. Identify damaged items and equipment for personal safety 8. Notify supervisor regarding damaged items and equipment for personal safety 				
LU3: Minimize risks to personal safety at work place	The trainee will be able to: <ol style="list-style-type: none"> 1. Maintain cleanliness and hygiene as per organizational policy 2. Comply with Health, hygiene and safety precautions before starting work 3. Follow organizational Health, hygiene and safety guidelines during work 4. Deal with resolvable problems according to prescribed procedures 	<ul style="list-style-type: none"> • Types of personal hygiene • Define safety reporting procedures and documentation • Importance of organizational Health, hygiene and safety guidelines • Explain resolvable problems at workplace • Importance of housekeeping at workplace 	Total: 7hrs Theory: 5hrs Practical: 2hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Safety manuals 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

	<ol style="list-style-type: none"> 5. Report resolvable problems to immediate supervisor 6. Place the tools equipment etc at their prescribed place after completion of work 				
LU4: Minimize risks to public safety	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Identify situations that may endanger the public safety 2. Document the incident at work sites 3. Eliminate workplace hazards at work sites 4. Identify damaged items and equipment related to public safety 5. Notify Situation that may endanger situation for safety measures 	<ul style="list-style-type: none"> • Outline commonly used hazard signs and safety symbols as per organization standards • Consult supervisor about risk management 	<p>Total: 10hrs Theory: 8hrs Practical: 2hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

Module 2: Maintain Personal Health, Hygiene and Safety

Objective of the module: After completing this module, the learner will be able to protect/apply occupational Safety, Health and Environment at workplace according to the industry's approved guidelines, procedures and interpret environmental rules/regulations. Trainee will be expected to identify and use Personal Protective Equipment (PPE) according to the work place requirements. The underpinning knowledge regarding Observe Occupational Safety and Health (OSH) will be sufficient to provide the basis for the job at workplace.

Duration: 30hours **Theory:** 20 hours **Practical:** 10 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify Hazards at Workplace	The trainee will be able to: <ol style="list-style-type: none"> 1. Interpret work processes and procedures correctly to identify risk to Health, hygiene and safety at workplace 2. Recognize processes, tools, equipment and consumable materials that have the potential to cause harm 3. Prepare Report of the identified risk to Health, hygiene and safety 	<ul style="list-style-type: none"> • Types of hazards that are most likely to cause harm to health and safety • Health and safety precautions • Techniques and methods to identify the risks of hazards at workplace • Explain different types of tools, equipment and consumable materials • Methods of Dealing with hazard to avoid any accident or injury 	Total: 07hrs Theory: 5hrs Practical: 2hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

LU2: Apply Personal Protective and Safety Equipment (PPE)	The trainee will be able to: <ol style="list-style-type: none"> 1. Select personal protective equipment in terms of type and quantity according to work orders. 2. Wear, adjust, and maintain personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures. 3. Ensure personal protective equipment is cleaned and stored in proper place. 	<ul style="list-style-type: none"> • Describe the types of Personal protective equipment (PPEs) • Importance of personal protective equipment • Define the Maintenance and cleaning of PPEs 	Total: 7hrs Theory: 5hrs Practical: 2hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • PPEs (Safety glasses, Ear muffs/ear plugs, Protective Gloves, Cap, Safety shoes etc.) 	<ul style="list-style-type: none"> • Class Room/ Simulated environment
LU3: Observe Occupational Safety and Health (OSH)	The trainee will be able to: <ol style="list-style-type: none"> 1. Maintain cleanliness and hygiene as per organizational policy 2. Comply with Health, hygiene and safety 	<ul style="list-style-type: none"> • Types of personal hygiene • Define safety reporting procedures and documentation 	Total: 7hrs Theory: 5hrs Practical: 2hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div>	<ul style="list-style-type: none"> • Class Room/ Simulated environment

	<p>precautions before starting work</p> <ol style="list-style-type: none"> 3. Follow organizational Health, hygiene and safety guidelines during work 4. Deal with resolvable problems according to prescribed procedures 5. Report resolvable problems to immediate supervisor 6. Place the tools equipment etc at their prescribed place after completion of work 	<ul style="list-style-type: none"> • Importance of organizational Health, hygiene and safety guidelines • Explain resolvable problems at workplace • Importance of housekeeping at workplace 		<ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Safety manuals 	
LU4: Dispose of hazardous Waste/materials	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Identify hazardous waste/ drug materials which needs to be disposed off 2. Collect hazardous or non-hazardous waste carefully from the designated area as per approved procedure 3. Use proper disposal hazardous containers for 	<ul style="list-style-type: none"> • Types of hazardous waste/ drug materials • Types of non-hazardous waste • Explain the difference between non-hazardous and hazardous waste 	<p>Total: 9hrs Theory: 5hrs Practical: 4hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/ Simulated environment

	<p>dispose-off hazardous waste as per procedure</p> <p>4. Take necessary precautions like putting masks and gloves while disposing hazardous waste/ materials as per standard operating procedure</p>	<ul style="list-style-type: none"> • Explain the hazardous or non-hazardous waste collection procedures • Define the hazardous or non-hazardous waste disposal procedures 			
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Module 3: Perform Basic Communication Skills

Objective of the module: After completing this module, the learner will be able to assist in the development of communication competence by providing information regarding different forms of communication and their appropriate use.

Duration: 30 hours **Theory:** 20 hours **Practical:** 10 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Work in Team	The trainee will be able to: <ol style="list-style-type: none"> 1. Treat team members with respect and maintain positive relationships to achieve common organizational goals 2. Listen to instructions carefully & comply with those instructions 3. Provide work related information to team members and identify interrelated work activities to avoid confusion 4. Adopt communication skills, appropriate to work activities and organizational/medical procedures 	<ul style="list-style-type: none"> • Importance and application of Work ethics • Explain the importance of Good communication skills (7Cs of effective communication) • Define Workplace dress code • Describe the role of team members and functionality of the teams • Describe team dynamics and stages of team development 	Total: 8hrs Theory: 6hrs Practical: 2hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pen <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class Room/ Simulated environment (manufacture)

	5. Identify problems and resolve them through discussion and mutual agreement	<ul style="list-style-type: none"> Describe Conflict resolution strategies 			
LU2: Follow Supervisor's instructions	The trainee will be able to: <ol style="list-style-type: none"> Carefully listen and note down the instructions of Supervisor Carry out the instructions of the supervisor Report to the supervisor as per organizational SOPs 	<ul style="list-style-type: none"> Define Reporting techniques 	Total: 8hrs Theory: 6hrs Practical: 2hrs	Consumable <ul style="list-style-type: none"> Notebooks Pen Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	Class Room/ Simulated environment manufacture)
LU3: Demonstrate Basic IT Skills	The trainee will be able to: <ol style="list-style-type: none"> Create folders and files and learn major commands of operating system/windows Type text and use major commands such as printing, editing, creating tables and graphs etc Generate office reports using appropriate computer applications 	<ul style="list-style-type: none"> Explain the importance of Basic computer skills Different Types of computer applications for office reports Types of internet browser 	Total: 14hrs Theory: 6hrs Practical: 8hrs	Consumable <ul style="list-style-type: none"> Notebooks Pen Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	Class Room/ Simulated environment manufacture)

	4. Use internet for sending/receiving emails and connecting through social or other media	<ul style="list-style-type: none"> • Enlist different types of social media • Explain Internet and E-mailing 			
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Module 4: Operate Computer Functions (General)

Objective of the module: The aim of this module to get knowledge, skills and understanding to Operate Computer Functions (General).

Duration: 30 hours **Theory:** 10 hours **Practical:** 20 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Set up the computer for use	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify physical components of computer 2. Identify peripheral devices of the computer 3. Connect all components of computer 4. Follow procedures to turn on the computer system 	<ul style="list-style-type: none"> • Basic parts of a computer • Definition of computer • Definition of Drives • Computer component 	Total: 14hrs Theory: 6hrs Practical: 8hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class Room/ Computer Lab
LU2: Organise files in folder	The trainee will be able to: <ol style="list-style-type: none"> 1. Create folders/subfolders with suitable names 2. Save files in relevant folders. 3. Rename and move folders in different drives. 	<ul style="list-style-type: none"> • Importance of organising files and folders on suitable locations • Procedure to save the files 	Total: 8hrs Theory: 2hrs Practical: 6hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia 	Class Room/ Computer Lab

	<ol style="list-style-type: none"> 4. Move folders and files using drag and drop techniques 5. Save folders and files on different media 6. Search for folders/subfolders and files using appropriate tool bars 7. Delete Folder files 8. Restore deleted folder files 	<ul style="list-style-type: none"> • Procedure to restore deleted folder and files 		<ul style="list-style-type: none"> • Internet • Computer system • PPEs (Safety glasses, Ear muffs/ear plugs, Protective Gloves, Cap, Safety shoes etc.) 	
LU3: Shut down computer system	The trainee will be able to: <ol style="list-style-type: none"> 1. Save any work to be retained 2. Close open application programs correctly 3. Shut down computer 4. Switch off any unused peripheral devices 5. Ensure computer safety 	<ul style="list-style-type: none"> • Peripheral devices • Shutting down computer system to ensure computer safety 	Total: 8hrs Theory: 2hrs Practical: 6hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Safety manuals 	Class Room/ Computer Lab

Module 5: Perform Soil Sampling for Lab Test

Objective of the module: After completing this module, the learner will be able to perform soil sampling which includes identification, collection and transportation of soil samples for laboratory analysis.

Duration: 110 hrs.

Theory: 20 hrs.

Practical: 90 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify soil area for sampling	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify areas on basis of soil topography for sampling 2. Select the field to be surveyed on the base of crop, salinity, soil level, etc. 	<ul style="list-style-type: none"> • Define Soil • Topography for soil sampling • Explain soil fertility and salinity • Interpretation of Layout plan/drawing of the field area for Soil sampling 	Total: 27hrs Theory: 6hrs Practical: 21hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners 	Class Room/ Site Specific Field Area
		<u>Practical Activity:</u> <ol style="list-style-type: none"> 1. Identify area for Soil sampling as per given layout plan. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen 	
LU2: Collect soil sample for analysis	The trainee will be able to: <ol style="list-style-type: none"> 1. Select tools and equipment as per requirement 	<ul style="list-style-type: none"> • Tools for soil sampling • Explain Soil Sampling • Methods for soil sampling 	Total: 58hrs Theory: 10hrs Practical: 48hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Flip charts • Pencils 	Class Room/ Site Specific Field Area

	<p>2. Perform homogenous and Heterogeneous soil sampling</p> <p>3. Perform Composite soil sampling</p>	<ul style="list-style-type: none"> Differentiate between Homogenous and Heterogeneous Soil samples Define Composite sample <p><u>Practical Activity:</u></p> <p>1. Make a field visit to collect following Soil samples:</p> <ul style="list-style-type: none"> Homogenous Heterogeneous Composite 		<ul style="list-style-type: none"> Erasers Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Pen Flip board Permanent marker Augar Spade Plastic Baskets Sieve PPEs Kit 	
LU3: Transport soil sample to the lab for analysis	<p>The trainee will be able to:</p> <p>1. Perform labeling of collected soil sample as per set standards</p> <p>2. Perform Packaging appropriately as per set standards</p>	<ul style="list-style-type: none"> Describe the criteria for labeling of soil sample Narrate packaging criteria for soil sample Follow transport protocols Maintain soil sample record 	<p>Total: 25hrs</p> <p>Theory: 4hrs</p> <p>Practical: 21hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Flip charts Pencils Erasers Sharpeners 	Class Room/ Site Specific Field Area

	3. Dispatch Soil sample for lab testing	<u>Practical Activity:</u> 1. Identify and label given Soil samples (homogenous, Heterogeneous and Composite) for lab analysis.		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen • Flip board • Permanent marker • Augar • Spade • Plastic Baskets • Sieve • PPEs Kit • Zipped polyethylene bags • Cardboard boxes • Sticky tape • Cords 	
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Module 6: Diagnose Plant Health Problems

Objective of the module: After completing this module, the learner will be able to diagnose plant health problems which include identification of signs and symptoms of plant health problems. Assess the severity, extent and speed of onset of health problems in a specific situation. Determine possible causes of the problem.

Duration: 120 hrs.

Theory: 20 hrs.

Practical: 100 hrs.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify Plant Symptoms	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify symptoms of Plant disease 2. Identify biotic/abiotic factors 3. Study habit and habitat of the pest 4. Assess the severity and extent of disease in a crop 	<ul style="list-style-type: none"> • Define Disease, Symptoms and Signs in plants • Explain biotic and abiotic factors • Difference between Insect and Pest 	Total: 48hrs Theory: 8hrs Practical: 40hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Flip charts • Pencils • Erasers • Sharpeners 	Class Room/ Site Specific Field Area
		<u>Practical Activity:</u> <ol style="list-style-type: none"> 1. Identify and enlist disease symptom in given plant samples. 2. Prepare insect collection box. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen • Flip board • Permanent marker • Augar 	

				<ul style="list-style-type: none"> • Spade • Plastic Baskets • Sieve • PPEs Kit 	
LU2: Collect plant sample for analysis	The trainee will be able to: <ol style="list-style-type: none"> 1. Select tools and equipment as per requirement 2. Select diseased Plant Sample 	<ul style="list-style-type: none"> • Explain the importance of Plant Sampling • Tools and equipment required for collection of Plant sampling • Methods for Plant sampling • Appropriate storage of collected samples 	Total: 46hrs Theory: 6hrs Practical: 40hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Flip charts • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen • Flip board • Permanent marker • Augar • Spade 	Class Room/ Site Specific Field Area
		<u>Practical Group Activity:</u> <ol style="list-style-type: none"> 1. Make groups of students to collect 5 different diseased plant samples. 			

				<ul style="list-style-type: none"> • Plastic Baskets • Sieve • PPEs Kit • Zipped polyethylene bags • Cardboard boxes • Sticky tape • Cords 	
LU3: Dispatch Plant sample to the lab for analysis	The trainee will be able to: <ol style="list-style-type: none"> 1. Perform labeling of collected plant sample as per set standards 2. Perform Packaging appropriately as per set standards 3. Dispatch plant sample for lab testing 	<ul style="list-style-type: none"> • Criteria for labeling of Plant samples • Packaging requirements for collected plant samples • Describe Transport Protocols • Procedure to maintain Plant sample data 	Total: 26hrs Theory: 6hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Flip charts • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen • Flip board 	Class Room/ Site Specific Field Area

				<ul style="list-style-type: none"> • Permanent marker • Augar • Spade • Plastic Baskets • Sieve • PPEs Kit • Zipped polyethylene bags • Cardboard boxes • Sticky tape • Cords 	
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Module 7: Perform Pesticides Pre-Application Tasks

Objective of the module: After completing this module, the learner will be able to perform Pesticides pre-application tasks which includes comprehensive knowledge of pest identification, scouting and data recording.

Duration: 130 hours **Theory:** 20 hours **Practical:** 110 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform Pest Scouting	The trainee will be able to: <ol style="list-style-type: none"> 1. Select appropriate time for scouting 2. Select appropriate method for scouting (Zig zag, Maryo's and Diagonal) 3. Perform field visit for pest inspection 4. Assess the severity of pest infestation 5. Prepare a site report for supervisor 	<ul style="list-style-type: none"> • Define pest scouting • Explain suitable methods of pest scouting (W, X and Z manner) • Describe Economic Threshold level (ETL) and Economic Injury Level (EIL) of pest in crops • Pest Scouting Report 	Total: 65hrs Theory: 10hrs Practical: 55hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen 	Class Room/ Site Specific Field Area
		<u>Practical Activity:</u> <ol style="list-style-type: none"> 1. Perform Pest scouting method, assigned by assessor. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tape • PPE's • Magnifying lenses • Torch 	

				<ul style="list-style-type: none"> • Tags 	
LU2: Collect Pest for identification	The trainee will be able to: <ol style="list-style-type: none"> 1. Select appropriate tools and equipment 2. Collect pest sample 3. Submit a pest collection report to the supervisor 	<ul style="list-style-type: none"> • Tools and equipment required for pest collection • Methods of Pest Sampling • Pest collection report <div> <u>Practical Activity:</u> <ol style="list-style-type: none"> 1. Identify the collected specimen. 2. Prepare Pest collection report/data sheet as per given instructions. </div>	Total: 65hrs Theory: 10hrs Practical: 55hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tape • PPE's • Magnifying lenses • Torch • Tags 	Class Room/ Site Specific Field Area

				<ul style="list-style-type: none"> • Cardboard boxes • Net racket • Killing jars 	
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Module 8: Apply Fertiliser

Objective of the module: After completing this module, the learner will be able to apply Fertilisers which includes comprehensive knowledge of identification and application of fertiliser.

Duration: 120 hours **Theory:** 20 hours **Practical:** 100 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify different Fertilisers	The trainee will be able to: 1. Classify different types of Fertilisers (Urea, CAN, DAP, SSP, MOP, SOP, etc.) 2. Select Fertilisers according to crop requirement as per given instructions	<ul style="list-style-type: none"> Define Fertiliser Difference between simple and compound Fertilisers Organic and inorganic Fertilisers Fertilisers application scheduling Estimation of Fertilisers doses for different growth stages (vegetative and reproductive) 	Total: 60hrs Theory: 10hrs Practical: 50hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners Pen 	Class Room/ Site Specific Field Area
		<u>Practical Activity:</u> 1. Calculate Fertilisers doses as per given instructions.		Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system Measuring tape PPE's Magnifying lenses Torch 	

				<ul style="list-style-type: none"> • Tags • Glass Jars 	
LU2: Apply Fertiliser	The trainee will be able to: <ol style="list-style-type: none"> 1. Adopt appropriate method for the application of Fertiliser 2. Select appropriate tools/equipment 3. Perform the Fertiliser application as per instructions 	<ul style="list-style-type: none"> • Fertiliser Application methods (broadcast, placement and fertigation) • Tools and equipment for Fertiliser application • SOPs for fertiliser application 	Total: 60hrs Theory: 10hrs Practical: 50hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tape • PPE's • Magnifying lenses • Torch • Plastic baskets 	Class Room/ Site Specific Field Area
		<u>Practical Activity:</u> <ol style="list-style-type: none"> 1. Apply fertiliser as per given instructions. 			

				<ul style="list-style-type: none"> • Weigh balance • Spoons • Tags • Fertilisers drill/machine • Sprayer 	
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General assessment guidance for *Pesticides & Fertiliser Technology*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional Assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final Assessment is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of Assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of a Pesticides & Fertiliser Technology include:

- Work performances, for example perform basic communication, maintain personal health, hygiene and safety, perform basic computer operations, and dispose the waste materials.
- Demonstrations, for example Soil Sampling and Pesticides Pre-Application Tasks Per
- Direct questioning, where the assessor would ask the student how to perform personal safety at work place, how they can communicate work place policy and

procedures, how they can handle documents, what are the benefits of organizing store merchandising

- Paper-based tests, such as multiple choice or short answer questions on communication at work place policy and procedures, handling documents, organizing store merchandizing
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Pesticides & Fertiliser Technology include:

- Perform Soil Sampling for Lab Test, Diagnose Plant health problems, Perform Pesticides Pre-Application Tasks and Apply Fertiliser

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

Principles of Assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if documentation or organizing procedures of Pesticides Pre-Application Tasks are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that documentation activity. An interview about the Pesticides Pre-Application Tasks would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing documents in words has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for *Pesticides & Fertilisers Technology*

This curriculum consists of 08 modules:

- **Module 1:** Comply with Work Health and Safety Policies
- **Module 2:** Maintain Personal Health, hygiene and safety
- **Module 3:** Perform Basic Communication Skills
- **Module 4:** Operate Computer Functions (General)
- **Module 5:** Perform Soil Sampling for Lab Test
- **Module 6:** Diagnose Plant health problems
- **Module 7:** Perform Pesticides Pre-Application Tasks
- **Module 8:** Apply Fertiliser

Sessional Assessment

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final Assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

The Assessment Team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 25 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 to 15 students, assessments would be carried out over a two-day period only.

Planning for Assessment

Sessional Assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to

insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final Assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the content for practical assessments in advance.

Complete List of Tools and Equipment

Sr no	Description	Quantity
1	Computer with internet	26
2	White board	1
3	Multimedia	1

List of Consumable Supplies

Sr no	Material	Quantity
1.	Note book	25
2.	Flip chart	25
3.	Pencil	25
4.	White sheets	25
5.	Eraser	25
6.	Sharpener	25
7.	Pen	25
8.	Chart Papers	25

9.	Board markers	1
10.	File covers	25
11.	Scotch tape	25
12.	Masks	25
13.	Gloves	25
14.	Goggles	25
15.	Fertilisers mixer	5
16.	Motors	5
17.	Measuring cylinders/containers	25
18.	Spade	25
19.	Microscopes	5
20.	Sprayer Tank	10
21.	Air Blast Sprayers	5
22.	Spraying Nozzle Sets	10
23.	Fire Buckets	1
24.	Respiratory Mask	25
25.	First Aid Box	5
26.	Calculator	25

27.	Measuring Tape	25
28.	Measuring Scale	25
29.	Ladder	1
30.	Soil Augars	12
31.	Polyethylene Sheets	100
32.	Sample collection Polyethylene bags	500
33.	Ice Box	5
34.	Magnifying glass/Lens	25
35.	Forceps	25
36.	Gardening Tool Kit	25

Credit Values

The credit value of the National Certificate Level 2 in Textile Merchandizing is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

Competency Standard	Credit	Estimate of hours
A. Comply with Work Health and Safety Policies	3	30
B. Maintain Personal Health, hygiene and safety	3	30
C. Perform Basic Communication Skills	3	30
D. Operate Computer Functions (General)	3	30
E. Perform Soil Sampling for Lab Test	11	110
F. Diagnose Plant health problems	12	120
G. Perform Pesticides Pre-Application Tasks	13	130
H. Apply Fertiliser	12	120