Syllabus For Agriculture Disease Management Technician

Course Name	Agriculture Disease Management Technician
Sector	AGRICULTURE
Course Code	AGR/2024/ADMT/355
Level	4
Occupation	Agricultural Extension Officer, Agriculture Disease Management Technician, Agriculture Environmental Compliance Officer
Job Description	The Agriculture Plant Health Management Technician plays a pivotal role in ensuring the well-being and optimal growth of crops by implementing integrated pest management strategies and monitoring plant health. Responsibilities include conducting field inspections to identify and diagnose plant diseases, pests, and nutrient deficiencies, recommending and implementing appropriate treatment measures. This role also involves the application of fungicides, pesticides and other disease control measures, ensuring compliance with safety and environmental regulations.
Course Duration	**Total Duration 480 Hrs (T-120, P-240, OJT-120 and ES-60)**
Trainees' Entry Qualification	• Grade 12 – Regular OR Vocational OR • 10th grade pass plus 2-year NTC/NAC in the relevant trade OR • Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma OR • 10th grade pass and pursuing continuous schooling OR • 10th grade pass with 2 years experience in the relevant field OR • Previous relevant Qualification of NSQF Level 3.0 with minimum education as 8th Grade pass with 3 year relevant experience OR • Previous relevant qualification of NSQF Level 3.5 with 1.5 year relevant experience
Trainers Qualification	M.Sc. (Ag.) in Horticulture/Agriculture with one year experience in relevant field **OR** B.Sc. (Hons.) Agriculture with 3 years experience in relevant field.

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Elective	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
1	**Introduction to pesticide**	Identify common pesticides and fertilizers including their types, classifications, mode of action and chemical compositions	Compulsory	20	10		30
2	**Plant disease management**	Identify and execute the plant disease management system.	Compulsory	20	40		60
3	**Pest & Weed management**	Diagnosis important plant diseases, insect pest management and weeds management	Compulsory	20	40		60
4	**Application of fertilizer**	Explain various fertilizer application techniques for nutrient deficiencies after soil testing and analysis	Compulsory	20	40		60
5	**Safety guidelines**	Use safety measures and guidelines for handling, storing and applying pesticides	Compulsory	10	20		30
6	**Safety Protocols and Environmental Considerations**	Assess the environmental impact of pesticide and fertilizer on soil, water, air, and non-target organisms.	Compulsory	10	20		30
7	**Regulatory compliance**	Recognize local and national regulations governing pesticide use, plant protection and environmental protection to ensure compliance in professional practice.	Compulsory	20	10		30
8	**OJT**	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	Compulsory	-	-	120	120
9	**Employability Skill**	As per guided curriculum	Compulsory	60	-		60
		TOTAL:		**180**	**180**	**120**	**480**

SYLLABUS:

Module No. 1:

Outcome: Identify common pesticides and fertilizers including their types, classifications, mode of action and chemical compositions.

Theory Content:

- Definition and role of pesticides in agriculture.
- Categories of pesticides: insecticides, herbicides, fungicides, and rodenticides.
- Importance of pest control for crop protection and yield optimization.
- Types and Classifications of Pesticides:
- Classification based on chemical structure, mode of action, and target pests.
- Overview of biopesticides and their increasing significance.
- Explanation of how pesticides work on pests.
- Common modes of action, such as nerve poisons, growth regulators, and stomach poisons.
- Understanding the specificity of different pesticides to target particular pests.
- Detailed examination of chemical compositions of various pesticides.
- Identification of active ingredients and formulation agents.
- Overview of the chemical properties influencing pesticide effectiveness and environmental impact.
- Introduction to Fertilizers
- Definition and purpose of fertilizers in plant nutrition.
- Categories of fertilizers: macronutrients, micronutrients, and secondary nutrients.
- Importance of balanced nutrition for plant growth and development.
- Exploration of different fertilizer types, including organic and inorganic fertilizers.
- Classification based on nutrient content: nitrogen, phosphorus, potassium, and others.
- Explanation of how fertilizers provide essential nutrients to plants.
- Understanding nutrient uptake mechanisms and transport within plants.
- Relationship between nutrient availability and plant growth stages.
- In-depth analysis of chemical compositions of common fertilizers.
- Identification of nutrient percentages and other components in fertilizer formulations.
- Consideration of pH levels and their impact on nutrient availability.

Practical Content:

- Identify common pesticides in various formulations.
- Demonstrate proper handling, mixing, and application techniques.
- Identify different fertilizer types based on packaging and labels.
- Application of fertilizers, considering plant requirements and soil conditions.

- Demonstrate the Calibration for the application equipment for precise fertilizer distribution.
- Demonstrations showcasing the mode of action of selected pesticides on target pests.
- Soil and plant tests to illustrate the absorption and utilization of nutrients from fertilizers.
- Analyse the chemical compositions of pesticides and fertilizers.
- Demonstrate the process of applying pesticides and fertilizers
- Apply the method of disposing the expired pesticides and fertilizers safely

Module No. 2: Plant disease management

Outcome: Identify and execute the plant disease management system.

Theory Content:

- Principles of plant disease management – Avoidance, eradication, exclusion, protection, resistance and therapy
- Brief idea about biological control and integrated disease management.
- Classification of fungicides(major groups)
- Antibiotics in plant disease management
- Fungicide formulations and modes of application
- New generation fungicides
- Compatibility of agro-chemicals

Practical Content:

- Demonstration of some commonly available fungicides, insecticides, herbicides, rodenticides, plant protection equipment.
- Demonstrate modes of application of different pesticides - seed treatment (dry and wet) soil treatment, spraying, and dusting.
- Determination of toxicity level of pesticide based on colour of label red blue, orange, green
- Calculation of fungicides, herbicides and insecticides required for spraying in agricultural field and spray volumes and its spraying.
- Use Safe handlings, application and storage of agro-chemicals
- Preparation of Bordeaux mixture (Copper sulphate, lime and water)
- Set up demonstration plots showcasing disease-resistant varieties and effective management practices

Module No. 3: Pest & Weed management

Outcome: Diagnosis important plant diseases, insect pest management and weeds management

Theory Content:

- General characteristics of the Phylum - Arthropoda and Nematoda, Class - Insecta and Arachnida.
- Different body parts and salient external morphological features of an ideal insect – grass hopper.
- Metamorphosis of insect – simple and complete metamorphosis.
- Different life stages of insect- egg, larva (caterpillar/grub/maggot), pupa and adult.
- Name of mouth parts of plant feeding insects.
- Insect order injurious to crops – Orthoptera, Isoptera, Hemiptera, Lepidoptera, Coleoptera, Hymenoptera and Diptera with example of one or two pests from each order
- Characterization, classification, propagation and dissemination of weeds
- Principles of pest management, Cultural, mechanical, physical, legislative, resistance, biological, microbial, botanical, chemical, biorational and other innovative approaches of pest management with outstanding examples.
- Brief idea about biological and microbial control.
- Insecticides – chemical and botanicals; forms, formulations and classification of chemical insecticides – based on the toxicity categories, mode of entry, mode of action and chemical nature. Waiting period of commonly used insecticides. Warning symbols and signals, pesticide application methods, types of spray
- Safe handling of pesticides, symptoms of pesticide poisoning/toxicity, first aid and antidotes for treating pesticide poisoning.
- Mechanical, cultural, biological and chemical methods
- Herbicides – Classification, mode of action and application
- Integrated weed management. Weed identification, chemical control and preventive measures.
- Definition, significance, Economic Threshold Level (ETL), Economic Injury Level (EIL),
- Difference between harmful and beneficial insects.
- Tools /components of integrated pest management (IPM).

Practical Content:

- Identify different types of diseases and pests of field crops, fruits vegetables under field condition
- Use a light trap/sticky trap/pheromone trap for monitoring and mass trapping of the insect pests.
- Identify common weeds of the location and their seasonality (summer, rainy, winter)
- Identify and select the procedure for collection and preservation disease and pest samples
- Collection of disease specimen (8 – 10 in no.), weeds (8 – 10 in no.) for herbarium and insect preserved (8 – 10 in no.) in dry/ formalin (take 10 ml formaldehyde and dissolve in 90 ml distilled water)
- Demonstrate some commonly available fungicides, insecticides, herbicides, rodenticides, plant protection equipment.
- Use the modes of application of different pesticides - seed treatment (dry and wet) soil treatment, spraying, dusting.
- Determination of toxicity level of pesticide based on colour of label red blue, orange, green
- Calculate of fungicides, herbicides and insecticides required for spraying in agricultural field and spray volumes and its spraying.

- Prepare Bordeaux mixture (Copper sulphate, lime and water)

Module No. 4: Application of fertilizer

Outcome: Explain various fertilizer application techniques for nutrient deficiencies after soil testing and analysis

Theory Content:

- Determine nutrient levels and identify deficiencies in the soil
- Visual signs of nutrient deficiencies in crops (viz. yellow leaves for nitrogen deficiency)
- Fertilizer selection containing the deficient nutrients based on soil test recommendation
- Fertilizer application techniques
  e.g. Broadcasting, Band placement, Foliar feeding, Drip irrigation, Side-dressing
- Application rates and timing process
- Organic amendments to improve soil structure and nutrient retention
- Compost-different methods, mechanical compost plants, vermin composting, green manures, oil cakes, sewage and sludge, bio gas plant slurry, plant and animal refuges.

Practical Content:

- Demonstrate soil sampling techniques to obtain soil sample
- Identify the different components in the soil and nutrient deficiencies
- Identify various inorganic fertilizers
- Practical application of fertilizer by different methods.
- Demonstrate the process of mixing fertilizers with other fertilizers and amendments.
- Demonstrate to calibrate spreaders, sprayers and irrigation system for accurate fertilizer application
- Identify fertilizer application equipment including broadcast spreaders, banding equipment and drip irrigation systems
- Explain the preparation of nutrient solutions and proper spraying techniques
- Set up field trials with control and treated plots to observe the impact of different fertilizer application techniques
- Practice optimum use of fertilizers in crops
- Practice safe methods of fertilizer storage and handling

Module No. 5: Safety guidelines

Outcome: Use safety measures and guidelines for handling, storing and applying pesticides

Theory Content:

- Appropriate Personal Protective Equipment (PPE)

- Proper handling mixing procedure
- Guidelines of storage procedure
- Precautionary statement on pesticide labels
- Calibration of application equipment to ensure accurate pesticide application
- Develop and communicate a spill response plan
- Maintain pre application procedures
- Application of pesticides at recommended rates to prevent environmental contamination
- Explain the requirements of personal health, safety and hygiene at workplace
- Common health related guidelines laid down by the organizations/Government at the workplace
- Maintain good housekeeping at the workplace

Practical Content:

- Demonstrate correct selection and use of PPE
- Use a suitable place for mixing and demonstrate proper handling and mixing procedures
- Examine pesticide storage facilities and inspect for proper segregation and storage conditions
- Interpret key information, precautionary statements and recommended safety measures for pesticide labels
- Demonstrate the calibration procedure time to time
- Organize a simulated emergency response scenario in case of pesticide spill
- Live demonstrate of pesticide application in a controlled environment
- Assess weather conditions for safe pesticide application
- Demonstrate personal hygiene practices to be followed at the workplace
- Show how to sanitize and disinfect one's work area regularly
- Demonstrate the adherence to the workplace sanitization and cleanliness

Module No. 6: Safety Protocols and Environmental Considerations

Outcome: Assess the environmental impact of pesticide and fertilizer on soil, water, air and non-target organisms.

Theory Content:

- Soil impact: Pesticides can affect soil quality by altering microbial populations, reducing beneficial organisms, and causing soil degradation.
- Improper fertilizer use can lead to soil nutrient imbalances, affecting microbial activity and nutrient cycling.
- Impact to water contamination and negatively impacting aquatic ecosystems
- Excessive fertilizer runoff can result in water pollution, causing algal blooms and degrading aquatic ecosystems.

- Impact on air: Pesticides may volatilize into the air, leading to air pollution and potential respiratory health hazards.
- Nitrogen-based fertilizers can contribute to air pollution through the release of ammonia and nitrous oxide.
- Non-target organisms: Pesticides can harm non-target organisms, including beneficial insects, birds, and mammals.
- Overuse of fertilizers may indirectly harm non-target organisms by disrupting food chains and ecosystems
- Integrated assessment considers cumulative effects on soil, water, air, and non-target organisms, aiming to minimize overall environmental impact.
- Implementing best management practices (BMPs) can mitigate environmental impacts, such as precision farming, buffer zones, and the use of slow-release fertilizers.

Practical Content:

- Conduct soil sampling before and after pesticide application to analyze changes in soil health parameters.
- Analyze soil nutrient levels over time, correlating them with fertilizer application rates to evaluate soil health.
- Monitor water quality in nearby streams or ponds, assessing pesticide residues and their effects on aquatic life.
- Monitor nutrient levels in water bodies downstream from agricultural areas, assessing the impact of fertilizer runoff.
- Use air monitoring equipment to measure pesticide drift and atmospheric concentrations during and after application.
- Use gas analyzers to measure gaseous emissions from fertilized fields and assess their impact on air quality.
- Conduct field observations and surveys to assess the abundance and diversity of non-target species before and after pesticide application.
- Develop a comprehensive assessment framework that includes monitoring multiple environmental parameters simultaneously.
- Demonstrate the application of BMPs in the field, comparing their effectiveness in reducing environmental impact.

Module No. 7: Regulatory compliance

Outcome: Recognize local and national regulations governing pesticide use, plant protection and environmental protection to ensure compliance in professional practice.

Content:

- **Central Insecticides Board and Registration Committee (CIB&RC)** is responsible for registering pesticides in India
- Registration process ensures the use of authorized pesticides, contributing to public safety and environmental protection.
- **Insecticides Act 1968** regulates the manufacture, sale, transport, distribution and

use of insecticides

- **West Bengal Insecticides rules 1985:** State – level rules govern the sale and use of insecticides within West Bengal
- **West Bengal Agricultural Pesticides rules 1975:** Regulate the distribution, sale and use of agricultural pesticides in West Bengal
- **The plant Quarantine (Regulation of Import into India) Order 2003:** Aim to prevent the introduction and spread of harmful plant pests
- **West Bengal Plant Quarantine (Regulation of Import into West Bengal) Order 2004:** State-specific quarantine regulations complement national measures.
- **The Environment (Protection)Act 1986:** The act empowers the central Government to take measures for environmental protection
- **State Environmental Impact Assessment Authority (SEIAA), West Bengal:** SEIAA assesses the environmental impact of projects within the state

Module 8: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **120 Hours.**)

Module 9: Employability Skills **(60 Hrs)**

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. 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
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 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.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

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

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

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

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely

19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

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

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Identify common pesticides and fertilizers including their types, classifications, mode of action and chemical compositions.	**After completion of this module students will be able to:** 1.1 Identify the role of pesticides in agriculture for pest control and crop protection. 1.2 Explain the category of pesticides 1.3 Overview of chemical properties influencing pesticide effectiveness. 1.4 Explore different fertilizer types, including organic and inorganic fertilizers. 1.5 Identify nutrient percentages and other components in fertilizer formulations. 1.6 Demonstrate calibration procedure of equipment to ensure precise fertilizer distribution. 1.7 Analysis the chemical compositions of pesticides and fertilizers 1.8 Demonstrate the correct process of applying pesticides and fertilizers 1.9 Apply the methods for safely disposing of expired pesticides and fertilizers.
2	Identify and execute the plant disease management system.	**After completion of this module students will be able to:** 2.1 Explain avoidance, eradication, exclusion, protection, resistance and therapy in plant disease management. 2.2 Classify major groups of fungicides. 2.3 Recognized different fungicide formulations and a clear explanation of modes of application. 2.4 Explain the compatibility of different agro-chemicals. 2.5 Identify and demonstrate commonly available fungicides, insecticides, herbicides, rodenticides, and

Module No.	Outcome	Assessment Criteria
		plant protection equipment. 2.6 Demonstrate of various modes of application for different pesticides, including seed treatment (dry and wet), soil treatment, spraying, and dusting 2.7 Determine the toxicity level of pesticides based on color-coded labels (red, blue, orange, green). 2.8 calculate fungicides, herbicides, and insecticides required for spraying in an agricultural field. 2.9 Prepare Bordeaux mixture using copper sulfate, lime, and water, demonstrating correct ratios and mixing procedures.
3	Diagnosis important plant diseases, insect pest management and weeds management	**After completion of this module students will be able to:** 3.1 Identify the diseases and the insect pests of important field crops. 3.2 Identify the diseases of important horticultural crops. 3.3 Select the insect pests of important horticultural crops. 3.4 Recognize the different symptoms of important fungal diseases. 3.5 Identify the different symptoms of important bacterial diseases. 3.6 Identify the different symptoms of important viral diseases. 3.7 Plan, select and execute different management strategies against seed borne diseases. 3.8 Plan, select and execute different management strategies against soil borne diseases. 3.9 Describe different management strategies against air borne diseases. 3.10 Describe different management strategies against sucking insect-pests. 3.11 Describe different management strategies against lepidopteron insect-pests. 3.12 Recognize the probable reasons of atypical symptoms (wilting / leaf curling /yellowing of leaves etc.) observed in plants. 3.13 Demonstrate the difference between fungal and bacterial wilt. 3.14 Differentiate between viral and nutrient deficiency symptoms.
4	Explain various fertilizer application techniques for nutrient deficiencies after soil testing and analysis	**After completion of this module students will be able to:** 4.1 Determine nutrient levels in the soil through soil testing 4.2 Explain the process of selecting fertilizers based on soil test recommendations. 4.3 Describe various fertilizer application techniques,

Module No.	Outcome	Assessment Criteria
		including broadcasting, band placement, foliar feeding, drip irrigation, and side-dressing. 4.4 Illustrate application rates and timing for different crops and soil conditions. 4.5 Identify various inorganic fertilizers commonly used in agriculture. 4.6 Demonstrate practical application of fertilizers using different methods such as broadcasting, band placement, foliar feeding, drip irrigation, and side-dressing. 4.8 Demonstrate the preparation of nutrient solutions. 4.9 Practice of optimum use of fertilizers in crops, considering crop requirements and environmental sustainability.
5	Use safety measures and guidelines for handling, storing and applying pesticides	**After completion of this module students will be able to:** 5.1 Explain the appropriate PPE required for handling pesticides. 5.2 Demonstrate proper handling and mixing procedures for pesticides. 5.3 Interpret precautionary statements on pesticide labels. 5.4 Demonstrate the calibration procedure for application equipment. 5.5 Maintain personal health, safety, and hygiene requirements at the workplace. 5.6 Implement good housekeeping practices at the workplace. 5.7 Demonstrate the application of pesticide in a controlled environment 5.8 Demonstrate adherence to workplace sanitization and cleanliness guidelines.
6	Assess the environmental impact of pesticide and fertilizer on soil, water, air, and non-target organisms.	**After completion of this module students will be able to:** 6.1 Explain how pesticides can affect soil quality, alter microbial populations, reduce beneficial organisms and cause soil degradation. 6.2 Exhibit the impact of pesticides and excessive fertilizer runoff on water contamination and aquatic ecosystems. 6.3 Describe how pesticides can harm non-target organisms, including beneficial insects, birds, and mammals. 6.4 Recognize the concept of integrated assessment, considering cumulative effects on soil, water, air, and non-target organisms. 6.5 Recognize the importance of implementing BMPs to mitigate environmental impacts. 6.6 Conduct field observations and surveys to assess the abundance and diversity of non-target species before and after pesticide application.
7	Recognize local and national regulations governing pesticide use, plant protection and environmental protection to ensure compliance in professional practice.	**After completion of this module students will be able to:** 7.1 Explain how CIB&RC contributes to public safety and environmental protection through the registration process. 7.2 Describe key provisions of the Insecticides Act 1968. 7.3 Exhibit state-level rules, specifically West Bengal Insecticides Rules 1985, govern the sale and use of insecticides within West Bengal. 7.4 Elaborate the West Bengal Agricultural Pesticides Rules 1975 and their role in regulating the distribution, sale, and use of agricultural pesticides in West Bengal. 7.5 Aware The Plant Quarantine (Regulation of Import into

Module No.	Outcome	Assessment Criteria
		India) Order 2003 and its objective to prevent the introduction and spread of harmful plant pests. 7.6 Explain The Environment (Protection) Act 1986 and its purpose in empowering the central government to take measures for environmental protection. 7.7 Describe the State Environmental Impact Assessment Authority (SEIAA) in West Bengal.
8	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).
9	Employability Skill	As per guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

COURSE NAME			
S No.	**Name of the Tool & Equipment**	**Specification**	**Quantity**
1.	Autoclave	Chamber volume should be 90-100 liters. It should operate with saturated steam under pressure of 15 to 22 PSI.	1 each
2.	Laminar air flow	Construction: Double walled Working area 4 ft x 2 ft x 2 ft Fitted with UV Germicidal lamp for sterilization. Fitted with Acrylic Front Door sliding type	1
3.	Air conditioner with timer	1.5 ton	2
4.	Microscope (Binocular Stereoscopic Zoom)	Dual heads for simultaneous viewing. Step magnification (10X-40X) *Top & Bottom transmitted cold light (Halogen Lighting Strictly) source*	10
5.	Compound Microscope	Focusing by coarse & fine focusing knobs. Eye piece : 10X Magnification : 100X-1000 X	10
6.	Homogenizer (Heavy duty)		2
7.	Heater		2
8.	Pressure cooker	22 L+ 12 L	1+1
9.	Balance	200g (2 decimal) and 5 kg capacity (2 decimal)	1 each
10.	Kitchen balance	Indigenous	1
11.	Continuous Shaker with flask holders and	Multi flask holder with RPM 40-400	2 (4'x4')

	rpm regulator		
12.	BOD incubator	350 L	2
13.	Hot air oven	Dimension(W×D×H): 300x300x300 mm; No of trays: 6	1
14.	Refrigerator	210 L	1
15.	Sealing machine	Large size	1
16.	SS mixing drum manual	~10 kg capacity	1
17.	pH meter	Indigenous	1
18.	Single glass distillation Unit	Indigenous	1
19.	Glass wares, plastic wares etc. i. Conical flask (500ml) ii. Petriplates iii. Test tube/culture tube iv. Beaker (1000ml, 500 ml, 250 ml) v. Measuring cylinder (1000 ml, 250 ml, 100 ml, 10 ml) vi. Tray vii. Slides and cover glass viii. Biology box	 Borosilicate Borosilicate ----do-- ----do-- Plastic Riviera/Olympus	 20 25 100 2 each 2 each 10 6 Box each 1
20.	Chemicals and consumables i. Agar Agar (500 g) ii. Dextrose (500 g) iii. Peptone (500 g) iv. Beef extract (500 g) v. NaCl (500 g) vi. Talc powder (500 kg)	Merck/Hi-media equivalent Indigenous	
21.	Manures and fertilizers	Manures (FYM, vermi compost, mustard cake, etc.), Fertilizers (urea, SSP, MOP, DAP, etc.)	As per requirement of different field crops

22.	Herbicides and Pesticides	Commonly available in market	As per requirement of different field crops
23.	PPE kit		30
24.	Spade		4
25.	Khurpa		4
26.	Soil mixer		1
27.	Computer /Laptop		1
28.	Computer chair and table		1 each
29.	Printer		1

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Identify common pesticides and fertilizers including their types, classifications, mode of action and chemical compositions	AGR/0267/OC1	30	80	0
Identify and execute the plant disease management system.	AGR/0267/OC2	20	80	0
Diagnosis important plant diseases, insect pest management and weeds management	AGR/0267/OC3	20	80	0
Explain various fertilizer application techniques for nutrient deficiencies after soil testing and analysis	AGR/0267/OC4	30	80	0
Use safety measures and guidelines for handling, storing and applying pesticides	AGR/0267/OC5	10	50	0
Assess the environmental impact of pesticide and fertilizer on soil, water, air, and non-target organisms.	AGR/0267/OC6	10	50	0
Recognize local and national regulations governing pesticide use, plant protection and environmental protection to ensure compliance in professional practice.	AGR/0267/OC7	30	80	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	AGR/0267/OC8	0	0	300
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0