



National Vocational Certificate Level 5 in Seed Processing & Biotechnology (Seed Processing Plant Technician)



National Vocational Certificate Level 5 in Seed Processing & Biotechnology (Seed Processing Plant Technician)



(Curriculum)

National Vocational and Technical Training Commission (NAVTTTC)

Government of Pakistan



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Introduction

Definition/Description of training program (Seed Processing Plant Technician)

Increasing demand in food supply due to increase in population putting pressure on agriculture sector day by day. Many factors like poor cultivation methods, lack of advanced machineries and non-availability of quality inputs also a big challenge for agriculture sector to feed this growing population. Therefore, governing bodies are now focusing for boosting production of better quality with high yield of agriculture commodities. Among the various challenges, availability of quality seeds to the farming community also a big challenge for authorities. Seed as a key for successful farming have prime importance in agriculture sector. Fortunately, industry is creating space for new businesses where Seed Processing & Biotechnology have potential for becoming focal point for investors.

Seed processing is a vital part of the technology to produce quality seeds for farming community, which includes operation involved in harvesting, cleaning, drying, seed treatments, seed quality testing, packaging and storage. Properly processed seed is a guaranty for high production rate of crops. Currently working seed processing units are also not producing satisfactory results. Limitation for their success includes various factors, among these factors availability of skilled labor is a major concern.

Keeping in view of the above, NAVTTC developed a qualification which is based on seed processing operations carried out in advanced processing industry techniques. This competency based national vocational qualifications have been developed to train the unskilled human resource on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increasing their livelihood income which ultimately help agriculture sector of country.

Training Course is based on competency standards which are defined by the industry and the traditional role of a trainer changes and shifts towards the facilitation of training. A trainer encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the site/workshop, some writing, some not even in the classroom or site/workshop but in another part of the



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building using special equipment. As trainees learn at different pace they might be at different stages in their learning, thus learning must be tailored to suit individual needs. The following facilitation methods (teaching strategies) are generally employed.

Purpose of the training program:

The purpose of this training is to set highly professional standards for seed processing and biotechnology in agriculture sector. The basic goals of establishing these credentials are as follows:

1. Equip with the latest Seed processing techniques
2. Improve crop production through availability of processed seed
3. Improve trainees' professional competence
4. Provide in-depth knowledge in seed processing operations
5. Enable the existing workforce to learn new technologies and methods
6. Provide flexible pathways and progressions in agriculture sectors
7. Enabling the youth with greater employment opportunities

Overall objectives of training program:

The main objectives of the National Vocational Certificate Level 5 in Seed Processing & Biotechnology (Seed Processing Plant Technician) are as follows:

- Improve the professional competence of Seed processing & Biotechnology
- Capacitate the local community and trainers in modern CBT training, methodologies and processes as envisaged under NVQF
- Provide flexible pathways and progressions in the Seed Processing & Biotechnology
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training for Seed processing & Biotechnology across the globe



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Competencies to be gained after completion of course:

At the end of the course, the trainee has attained the following core competencies:

Module 1: Operate Advance Seed Processing Machineries

Module 2: Perform Seed Quality Test

Module 3: Perform Seed Packaging and Storage

Module 4: Maintain Inventory for Seed Processing

Module 5: Prepare Plantlets by Tissue Culture Technique

Module 6: Manage and Supervise the Job Activities

Module 7: Develop Entrepreneurial Skills

Module 8: Practice Professionalism

Possible available job opportunities, available immediately and later in the future:

- Seed Processing Plant Technician
- Seed Processing Plant In charge



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Trainee entry level:

The entry level for National Vocational Certificate Level 4 in Construction Sector (**Seed Processing Plant Technician**) is given below:

Title	Entry requirements
National Vocational Diploma Level 5 in Seed Processing and Biotechnology (Seed Processing Plant Technician)	The entry requirement for this qualification would be National Vocational Certificate Level 4 in Seed Processing and Biotechnology (Seed Processing Supervisor)

Minimum qualification of trainer:

B.Sc. (Hons) Agriculture with preferably major Biotechnology/Plant Breeding and Genetics with at least three-year experience in relevant field

Recommended trainer: trainee ratio

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

Medium of instruction i.e., language of instruction:

Instructions will be in Urdu/ English/ Local language.



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Duration of the course (Total time, Theory & Practical time):

The distribution of contact hours is given below:

Total	-	1200 hours
Theory	-	460hours (40%)
Practical	-	740 hours (60%)

Proposed Course Duration-1 Year

Sequence of Modules:

Module 1: Operate Advance Seed Processing Machineries 240 hrs.	Module 4: Maintain Inventory for Seed Processing 30 hrs.	Module 7: Develop Entrepreneurial Skills 60 hrs.
Module 2: Perform Seed Quality Test 210 hrs.	Module 5: Prepare Plantlets by Tissue Culture Technique 210 hrs.	Module 8: Practice Professionalism 300 hrs.
Module 3: Perform Seed Packaging and Storage 90 hrs.	Module 6: Manage and Supervise the Job Activities 60 hrs.	



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Summary template-overview of the curriculum:

Following is the structure of the course:

Sr No	Code	Competency Standards	Occupation	NVQF Level	Category	Estimated Contact Hours			Cr Hr
						Th	Pr	Total	
Level 2									
1.	0811SP&B04-A	Operate Advance Seed Processing Machineries	Seed Processing Plant Technician	5	Technical	96	144	240	24
2.	0811SP&B04-B	Perform Seed Quality Test		5	Technical	84	126	210	21
3.	0811SP&B04-C	Perform Seed Packaging and Storage		5	Technical	36	54	90	09
4.	0811SP&B04-D	Maintain Inventory for Seed Processing		5	Technical	12	18	30	03



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5.	0811SP&B04-E	Prepare Plantlets by Tissue Culture Technique		5	Technical	84	126	210	21
6.	0811SP&B04-F	Manage and Supervise the Job Activities		5	Functiona l	24	36	60	06
7.	0811SP&B04-G	Develop Entrepreneurial Skills		5	Generic	24	36	60	06
8.	0811SP&B04-H	Practice Professionalism		5	Generic	10 0	200	300	30
		Total				460	740	1200	120
		Percentage				40	60		



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Module 1: Operate Advance Seed Processing Machineries

Objective: The aim of this module to get knowledge, skills and understanding to operate advance seed processing machineries

Duration: 240Hours

Theory: 96 Hours

Practice: 144 Hours

Credit Hours: 24

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Maintain Cleanliness of machinery	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Arrange tools and equipment 2. Perform cleanliness of required machinery 3. Maintain hygienic conditions of workplace 	<ul style="list-style-type: none"> • Understanding of tools and equipment • Knowledge about hygienic conditions at workplace • Describe cleaning methods for machinery <p>Activity: Practice to perform cleanliness of machinery</p>	<p>Total:40hrs Theory: 16hrs Practical: 24hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker • Duster <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • PPES • Multimedia • Computer • Scalper • Dehumidifier • Grain separator cleaning 	<ul style="list-style-type: none"> • Class Room • Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				machine <ul style="list-style-type: none"> • Sheller • Air classifier • Dehullers • Management and maintenance tools • Destoner 	
LU2: Perform Pre-cheks	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange tools/equipment 2. Perform sanitization of tools 3. Calibrate required tools and equipment 4. Perform trouble shooting 5. Follow standard 	<ul style="list-style-type: none"> • Explain sanitation procedure for processing machineries • Explain troubleshooting • Knowledge of equipment calibration <p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform machinery post checks • Practice to perform sanitization of tools/equipment/machineries 	Total: 60hrs Theory: 24hrs Practical: 36hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker • Duster Non-Consumable <ul style="list-style-type: none"> • White board • Multimedia • PPEs • Computer 	<ul style="list-style-type: none"> • Class Room • Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	safety checks before and after use of machinery.			<ul style="list-style-type: none">• Dehumidifier• Grain separator cleaning machine• Sheller• Air classifier• Management and maintenance tools• Dehumidifier• Grain separator• Dehullers• Destoner• Seed sorter• Color sorting machine• Seed treatment machines• Packaging	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				machines	
LU3: Execute seed processing operations	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Operate seed Separator according to SOPs Operate Colour grader according to SOPs Operate seed polishing machines according to SOPs Operate seed treatment machines according to SOPs Operate seed packaging machines according to SOPs 	<ul style="list-style-type: none"> Knowledge about seed separator Describe color grader procedure Understanding of working principle for seed polishing machine Knowledge of operations regarding to seed treatment machines Understanding of seed packaging machine operation <p>Activity:</p> <ul style="list-style-type: none"> Practice to perform seed processing operations: <ul style="list-style-type: none"> ✓ Seed separation ✓ Seed polishing ✓ Seed treatment ✓ Seed packaging 	<p>Total 140hrs Theory: 56hrs Practical: 84hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpener White board marker Duster <p>Non Consumable</p> <ul style="list-style-type: none"> White board PPES Multimedia Computer Dehumidifier Grain separator Dehullers Destoner Seed sorter Color sorting machine 	<ul style="list-style-type: none"> Class Room Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>6. Follow health and safety guidelines</p> <p>7. Maintain records</p>			<ul style="list-style-type: none"> • Seed treatment machines • Packaging machines • Seed scalper • De-breeder • Sacrifier • Screen cleaner • Vibratory separator • Spiral superb • Disc intuited • Electronic separator • Inclined separator • Magnetic separator • Roll milling • Gravity separator • Magnetic 	



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				<p>separator</p> <ul style="list-style-type: none">• Friction cleaner• Drum pre cleaner• Air screen cleaner with gravity table.• Polishing machine bean & grain• Color separator• Corn germ extraction machine.• Peeling machine• Air suction separator	



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Module2: Perform Seed Quality Test

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform seed quality test.

Duration: 210 Hours

Theory:84 Hours

Practice: 126 Hours

Credit Hours: 21

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare for quality test	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Collect sample for testing 2. Prepare sample according to required quality test 3. Follow health and safety guidelines 4. Maintain 	<ul style="list-style-type: none"> • Explain collection methods of sample • Understanding of seed testing • Knowledge of seed quality tests • Describe importance of record maintaining <p>Activity:</p> <ul style="list-style-type: none"> • Practice to collect sample • Practice to prepare sample according to test • Practice to maintain record 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p style="background-color: #d9ead3; padding: 2px;">Consumab</p> <ul style="list-style-type: none"> • Notebooks • Pen • White board marker • Duster • Tight jar • Muslin cloth <p style="background-color: #d9ead3; padding: 2px;">Non-Consumable</p> <ul style="list-style-type: none"> • White board • PPES • Multimedia 	<ul style="list-style-type: none"> • Class Room • Lab/Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	records			<ul style="list-style-type: none"> Internet Computer system Weighing balance 	
LU2: Perform Germination test	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange tools and equipment 2. Perform warm germination test 3. Perform sand germination test 4. Perform Tetrazolium (TZ) test 5. Perform Soak test 6. Perform blotter paper test 7. Perform agar plate test 	<ul style="list-style-type: none"> • Define germination • Describe different types of germination test • Explain method for compilation of testing result <p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform germination test according to following methods: <ul style="list-style-type: none"> ✓ Warm Germination ✓ Sand Germination ✓ Tetrazolium (TZ) test ✓ Soak test ✓ Blotter paper test ✓ Agar plate test • Practice to record results 	Total:45hrs Theory:18hrs Practical:27hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pen • White board marker • Duster • Agar • Blotter paper • Tetrazolium solution • Germination Paper • Germination Towel • Wire mesh • Tight jar 	<ul style="list-style-type: none"> • Class Room/site • Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	8. Record results 9. Prepare reports			<ul style="list-style-type: none"> • Muslin cloth • Field soil Non-Consumable • White board • PPES • Multimedia • Internet • Computer system • Accelerated aging chamber • Equipment for germination test • Aluminiumtray • Plastic tray • Aging tray • Management and maintenance 	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				tools <ul style="list-style-type: none"> • Weighing balance • Incubator • Growth chamber 	
LU3: Perform Pathogenicity test	The trainee will be able to: <ol style="list-style-type: none"> 1. Prepare for work 2. Perform ELISA 3. Prepare reports 	<ul style="list-style-type: none"> • Knowledge of tools/equipment for Pathogenicity test • Explain ELISA technique • Describe basic principle and types of ELISA <p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform ELISA • Practice to prepare test reports 	Total: 75hrs Theory: 30hrs Practical: 45hrs	Consumables <ul style="list-style-type: none"> • Notebooks • Pencil • White board marker • Duster • ELISA Kits • Micro pipette • Tips • PPEs • ELISA plates • Chemicals 	<ul style="list-style-type: none"> • Class Room/Site • Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • ELISA equipment • ELISA reader 	
LU4: Perform Vigor test	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange tools and equipment 2. Test seed vigour according to method 3. Record results 	<ul style="list-style-type: none"> • Knowledge of tools/equipment for Vigor test • Explain Vigor test and its types • Describe vigor index <p>Activity</p> <ul style="list-style-type: none"> • Practice to perform vigor test <ul style="list-style-type: none"> ✓ Conductivity test ✓ Paper piercing test ✓ Hiltner test ✓ Cold test ✓ Accelerated Aging test 	Total:45hrs Theory:18hrs Practical:27hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • PPEs • White board marker • Duster • Chemicals 	<ul style="list-style-type: none"> • Class Room/Site • Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	4. Prepare report 5. Maintain records	<ul style="list-style-type: none"> • Practice to perform seedling vigor index • Practice to record test results and prepare report 		<ul style="list-style-type: none"> • Tight jars • Muslin cloth • Wire mash • Non-Consumable • White board • Multimedia • Internet • Computer system • Conductivity meter • Germination box • Aluminum trays • Sand marker • Germinators 	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<ul style="list-style-type: none"> Accelerated aging chamber 	
LU5: Perform Moisture determination test	The trainee will be able to: <ol style="list-style-type: none"> Arrange tools and equipment Evaluate moisture content in seed according to standard test method Record results according to SOPs 	<ul style="list-style-type: none"> Knowledge of tools/equipment for Moisture determination test Define moisture content Explain moisture determination test and its types <p>Activity</p> <ul style="list-style-type: none"> Practice to perform moisture determination test <ul style="list-style-type: none"> ✓ Desiccation test ✓ Oven drying method ✓ Karl Fishers method ✓ Distillation method Practice to perform calculation of moisture contents from seed Practice to record test results 	Total:30hrs Theory:12hrs Practical:18hrs	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pen White board marker Duster Seed Chemicals <p>Non Consumable</p> <ul style="list-style-type: none"> White board PPES Multimedia Internet Computer 	<ul style="list-style-type: none"> Class Room Site Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				system <ul style="list-style-type: none"> • Constant temperature precision hot-air electric oven. • Weighing bottles/Moisture containers. • Desiccators with silica gel. • Maintenance tools • Tong. • A brush/A steel brush. • Analytical balance capable of weighing up to 1mg. • Distillation chamber 	



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Module3: Perform Seed Packaging and Storage

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform seed packaging and storage.

Duration: 90 Hours

Theory: 36Hours

Practice:54Hours

Credit Hours: 9

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare work for packaging	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange tools and equipment/machinery for packaging 2. Perform pre-checks for packing machines 3. Arrange packaging material according to work instructions 	<ul style="list-style-type: none"> • Knowledge of tools/equipment/ machinery for packaging • Explain pre-checks for packaging machine • Knowledge of packaging material <p>Activity</p> <ul style="list-style-type: none"> • Practice to arrange tools/equipment/ machinery and material • Practice to perform pre checks for packaging 	Total: 15hrs Theory: 6hrs Practical: 9hrs	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Duster • PPEs • Seed <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Filling Machines 	<ul style="list-style-type: none"> • Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		machine		<ul style="list-style-type: none"> • Sealers • Management and maintenance tools • Strapping/Bundling Machines • Stretch Wrapping Machines • Air Pillow Machines • Flow wrapper • Strapping Machine • Accumulator • Bag openers • Capping Machine • Valve bagger machine • Compression bagger • Vaccum sealer 	
LU2. Execute seed packaging	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Arrange processed seed for packaging 2. Collect quality test 	<ul style="list-style-type: none"> • Understanding of quality test report • Explain packaging operation • Knowledge of pre and post 	<p>Total:30hrs</p> <p>Theory:12hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners 	<ul style="list-style-type: none"> • Class Room/site • Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>reports</p> <ol style="list-style-type: none"> 3. Perform packaging operation according to work instructions 4. Follow safety standard checks for pre and post packaging. 5. Maintain Records 	<p>safety checks</p> <ul style="list-style-type: none"> • Understanding of record maintenance <p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform seed packaging operations 	<p>Practical: 18hrs</p>	<ul style="list-style-type: none"> • White board marker • Duster • PPEs • Seed • Packaging material <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Filling Machines • Sealers • Management and maintenance tools • Strapping/Bundling Machines • Stretch Wrapping Machines • Air Pillow 	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				Machines <ul style="list-style-type: none"> • Flow wrapper • Strapping Machine • Accumulator • Bag openers • Capping Machine • Valve bagger machine • Compression bagger • Vaccum sealer 	
LU3. Perform Labeling of processed seeds	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange material for labeling 2. Collect quality data reports 3. Prepare label according to work instructions 4. Execute labeling method 5. Maintain Records 	<ul style="list-style-type: none"> • Explain the importance of labelling • Understanding of seed labelling • Describe labelling methods <p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform labeling 	Total: 15hrs Theory: 6hrs Practical: 9hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Duster • PPEs • Seed 	<ul style="list-style-type: none"> • Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<ul style="list-style-type: none"> • Labels • Permanent markers • Thread and needle Non-Consumable • White board • Multimedia • Internet • Computer system • Printer • Staplers 	
LU4. Perform storage of seed	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange materials required for storage 2. Execute storage operation according to standard requirements 	<ul style="list-style-type: none"> • Explain importance of storage of processed seed • Describe storage operation <p>Activity</p> <ul style="list-style-type: none"> • Practice to perform storage operation 	Total: 15hrs Theory: 6hrs Practical: 9hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker 	<ul style="list-style-type: none"> • Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	3. Maintain records			<ul style="list-style-type: none"> • Duster • PPEs • Seed • Storage bag • Polyethylene <li style="background-color: #cccccc;">Non-Consumable • White board • Multimedia • Internet • Computer system • Storage bin • Storage chamber • Air tight jars 	
LU5.Handle storage commodities	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Maintain microclimatic condition according to storage requirements 2. Perform periodic 	<ul style="list-style-type: none"> • Knowledge of microclimatic condition for storage according to commodities • Explain periodic checks for contamination/spillage 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:</p>	<ul style="list-style-type: none"> <li style="background-color: #cccccc;">Consumable • Notebooks • Erasers • Sharpeners • White board 	<ul style="list-style-type: none"> • Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>checks for contamination/spillage</p> <ol style="list-style-type: none"> 3. Execute periodic pest control measure 4. Follow safety requirements 5. Maintain records 	<ul style="list-style-type: none"> • Understanding of pest control measure <p><u>Activity</u></p> <ul style="list-style-type: none"> • Practice to perform pest control measures • Practice to maintain microclimatic conditions 	<p>9hrs</p>	<ul style="list-style-type: none"> marker • Duster • PPEs • Chemicals <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Thermometer • Hygrometer • Sprayers • Fumigator 	



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Module4: . Maintain Inventory for Seed Processing

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform documententation and record keeping of seed processing

Duration: 30 Hours

Theory: 12Hours

Practice: 18Hours

Credit Hours: 3

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Maintain Inventory register	The trainee will be able to: <ol style="list-style-type: none"> Maintain stock register of seed lot as per standard format. Maintain cash book on prescribed format. Maintain fixed assets register as per prescribed format. Maintain raw and processed seed registers according to standard format. 	<ul style="list-style-type: none"> Describe importance of inventory register Knowledge of stock register Knowledge of cash book Understanding of fixed assets register Knowledge of raw and processed seed register <p>Activity</p> <ul style="list-style-type: none"> Practice to maintain stock register 	Total: 15hrs Theory: 6hrs Practical: 9hrs	Consumable <ul style="list-style-type: none"> Notebooks Erasers Pencil Sharpeners White board marker Duster PPEs Inventory register Stock register 	<ul style="list-style-type: none"> Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		<ul style="list-style-type: none"> Practice to maintain cash book Practice to maintain fixed assets register Practice to maintain raw and processed seed register 		<ul style="list-style-type: none"> Cash book Non-Consumable White board Multimedia Internet Computer system Calculator 	
LU2. Maintain daily performance report	The trainee will be able to: <ol style="list-style-type: none"> Maintain seed register. Check quantity of raw seed received from field. Maintain record of the following. <ul style="list-style-type: none"> Initial moisture of raw seed Record of dried lots Final moisture level of the dried lots 	<ul style="list-style-type: none"> Describe importance of daily performance report <p>Activity:</p> <ul style="list-style-type: none"> Practice to maintain record includes: <ul style="list-style-type: none"> ✓ Initial moisture of raw seed ✓ Record of dried lots ✓ Final moisture level of the dried lots ✓ Quantity of raw seed processed. 	Total: 15hrs Theory: 6hrs Practical: 9hrs	Consumable <ul style="list-style-type: none"> Notebooks Erasers Pencil Sharpeners White board marker Duster PPEs Inventory 	<ul style="list-style-type: none"> Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<ul style="list-style-type: none">Quantity of raw seed processed.Quality of processed seed obtained. <p>4. Maintain register mentioning the time of starting and closing of the processing machines.</p> <p>5. Maintain register of seed treatments.</p>	<ul style="list-style-type: none">✓ Quality of processed seed obtained.Practice to maintain register from starting to closing of the processing machinesPractice to maintain register of seed treatment		<ul style="list-style-type: none">registerStock registerCash bookNon-ConsumableWhite boardMultimediaInternetComputer systemCalculator	



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Module5: Prepare Plantlets by Tissue Culture Tehnique

Objective of the module: The aim of this module to get knowledge, skills and understanding to prepare plantlets by tissue culture technique

Duration: 210 Hours

Theory: 84Hours

Practice: 126Hours

Credit Hours:21

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare the stock solution	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange the glassware & chemicals 2. Prepare Macronutrient stock solution 3. Prepare Micronutrient stock solution 4. Prepare Vitamin stock solution 5. Prepare Hormones stock solution 	<ul style="list-style-type: none"> • Define stock solution • Describe macro and micronutrient • Describe macro and micronutrient stock solution preparation • Describe vitamin stock solution preparation • Explain preparation of hormones stock solution <p>Activity</p>	Total: 40hrs Theory: 16hrs Practical: 24hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Duster • PPEs • Pencils • Glassware • Chemicals 	<ul style="list-style-type: none"> • Class Room/Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		<ul style="list-style-type: none"> Practice to arrange glassware and chemicals Practice to prepare macronutrient/ micronutrient/vitamin/ hormones stock solutions 		<ul style="list-style-type: none"> Plant growth Regulator Macro/Micronutrients Hormones <p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Autoclave Dry heat ovens 	
LU2. Prepare media	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Prepare plan for working Mix the stocks as per plan Prepare media according to SOPs 	<ul style="list-style-type: none"> Describe media preparation Define tissue culture media Explain media components <p>Activity:</p> <ul style="list-style-type: none"> Practice to prepare media 	<p>Total:30hrs</p> <p>Theory:12hrs</p> <p>Practical:18hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Erasers Sharpeners White board marker Duster 	<ul style="list-style-type: none"> Class Room Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	4. Maintain the record 5. Follow health and safety guidelines			<ul style="list-style-type: none"> • Glassware • PPEs • Media ingredient • Deionized water • Non-Consumable • White board • Multimedia • Internet • Computer system • Autoclave 	
LU3.Perform sterilization	The trainee will be able to: <ol style="list-style-type: none"> 1. Arrange tools and equipment 2. Perform sterilization of glassware's 3. Perform 	<ul style="list-style-type: none"> • Define contamination • Explain sterilization and its mechanism • Describe workplace hazards • Describe the sources involved in contamination of tissue culture process <p>Activity:</p>	Total: 34hrs Theory: 16hrs Practical: 18hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Duster 	<ul style="list-style-type: none"> • Class Room • Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	sterilization of plastic wares 4. Perform sterilization of tools and equipment 5. Perform sterilization of stock solution 6. Perform sterilization of media 7. Follow health and safety guidelines	<ul style="list-style-type: none"> Practice to perform sterilization includes: <ul style="list-style-type: none"> ✓ Sterilization of glassware's ✓ Sterilization of plastic wares ✓ Sterilization of tools and equipment ✓ Sterilization of stock solution ✓ Sterilization of media 		<ul style="list-style-type: none"> PPEs Chemicals Glassware Non Consumable White board Multimedia Internet Computer system Autoclave Dry heat oven 	
LU4. Perform tissue culturing	The trainee will be able to: 1. Arrange tools and equipment 2. Prepare explants for	<ul style="list-style-type: none"> Define tissue culture Define explant Explain tissue culturing method <p>Activity:</p>	Total: 56hrs Theory: 20hrs Practical: 36hrs	Consumable <ul style="list-style-type: none"> Notebooks Erasers Sharpener White board 	<ul style="list-style-type: none"> Class Room/Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>inoculation</p> <p>3. Perform Inoculation and establish primary cultures</p> <p>4. Perform sub cultures for shoot multiplication</p> <p>5. Follow health and safety guidelines</p>	<ul style="list-style-type: none"> Practice to perform tissue culturing 		<p>marker</p> <ul style="list-style-type: none"> Duster Sampling bags PPEs Explant <p>Non-Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Autoclave Glassware Tissue culture lab equipments 	
LU5.Perform acclimatization	<p>The trainee will be able to:</p> <p>1. Arrange acclimatize materials</p>	<ul style="list-style-type: none"> Define acclimatization Explain the process of acclimatization Understanding of hardening of plantlets 	<p>Total:40hrs</p> <p>Theory:16hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Erasers Sharpeners 	<ul style="list-style-type: none"> Class room/site/Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<ol style="list-style-type: none"> 2. Prepare plantlets for acclimatization 3. Perform acclimatization and hardening of plantlets according to SOP 4. Follow health and safety guidelines 	<p>Activity:</p> <ul style="list-style-type: none"> • Practice to perform acclimatization • Practise to perform hardening of plantlets 	<p>Practical:24hrs</p>	<ul style="list-style-type: none"> • White board marker • Duster • Sampling bags • PPEs • Plantlets <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Autoclave • Glassware • Tissue culture lab equipments 	



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Module6: Manage and Supervise the Job Activities

Objective of the module: The aim of this module to get knowledge, skills and understanding to manage and supervise the job activities

Duration: 60Hours

Theory: 24Hours

Practice: 36Hours

Credit Hours:6

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Plan for on-site operations	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Consult with the client to obtain required information 2. Prepare SOPs in accordance with the identified requirements. 3. Prepare the process flow diagram in order to achieve Quality outcome. 4. Break down work of activities into small achievable components and efficient sequences 5. Recognize site hazards and the personal protective equipment 	<ul style="list-style-type: none"> • Explain principles of planning and project management • Explain roles and responsibilities for different levels of site supervision. • Explain planning method for on-site operations • Knowledge about process flow diagram 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • 	Class Room / Plant Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>(PPE) and safety procedures specified for job</p> <p>6. Organize site induction for support personnel as required</p> <p>7. Plan housekeeping activities prior to and post completion of work</p>	<ul style="list-style-type: none"> • Understanding of health and safety standards • Understanding of house keeping <p>Activity:</p> <ul style="list-style-type: none"> • Practice to prepare activities plan for a specific crushing job order including break down of activities, recognize site hazards, prepare the demand of 			



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		required equipment's and man power.			
LU2: Supervise work activities to achieve desired results	The trainee will be able to: <ol style="list-style-type: none"> List and arrange required resources prior to commencement of work Recognize the areas of work which could result in a delay of work, wastage of material or damage to tools. Allocate responsibility to required team members to avoid conflicts Review work plan in response to new information, urgent requests, changed situations or instructions from concern personnel Cooperate with team members to 	<ul style="list-style-type: none"> Understanding about causes of delay in work, wastage of material or damage to tools. Explain documentation and record system of the inspection body <p>Activity:</p> <ul style="list-style-type: none"> Practice to manage task allocation to 	Total: 15 hrs. Theory: 6 hrs. Practical: 9hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils White board marker Non-Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	<ul style="list-style-type: none"> Class Room/ Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	achieve common goals	team member for the specific crushing job order, trace out the weak area of work and review the work plan.			
LU3: Perform on- site inspection	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Conduct inspection of processes & materials according to inspection plan 2. Identify defects and deficiencies in product & processes 3. Record defects and deficiencies with evidence in product & processes (if required) 4. Perform test as per standard procedure for determining the physical properties of materials 	<ul style="list-style-type: none"> • Describe the information relevant to inspection activities and document preparation for recoding inspection results. • Differentiate various types of deficiencies in inspection activities 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/ Plant Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>and product.</p> <ol style="list-style-type: none"> 5. Collect the samples of materials & products for lab testing as per standards 6. Complete the sampling document as per requirement 7. Check the actions taken for rectification of snag list 8. Record the non-compliance and expected breaches of contract as per SOPs. 	<ul style="list-style-type: none"> • Describe site problems and recommended corrective actions • Describe the procedure to perform on- site inspection <p><u>Activity:</u></p> <ul style="list-style-type: none"> • Conduct inspection of crushing plant with emphasizes on deficiencies and defects in process & production including collection of samples of material & product and 			



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		<ul style="list-style-type: none"> collect pictorial evidence etc. 			
<p>LU4: Prepare the inspection report.</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Collect and review the information relevant to inspection activities for recoding in section results 2. Verify the integrity of information supplied by other party as a part of the inspection process 3. Record inspection observations and findings 4. Recommend the necessary corrective actions for tackling the identified problems 	<ul style="list-style-type: none"> • Explain the procedure to prepare the inspection report. • Understanding about third/other party inspection process • Explain reporting standards <p>Activity:</p> <ul style="list-style-type: none"> • Prepare the inspection report with respect to standards 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Whit board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room



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Module7: Develop Entrepreneurial Skills

Objective of the module: The aim of this module is to get knowledge, skills and understanding to develop entrepreneurial skills.

Duration: 60Hours

Theory: 24Hours

Practice: 36 Hours

Credit Hours: 6

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Develop a business plan	The trainee will be able to: <ol style="list-style-type: none"> 1. Conduct market survey to collect information 2. Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses 3. Compile the information collected through the market survey, in the business plan format 	Describe market survey and types of information collected such as <ul style="list-style-type: none"> ✓ Customer /demand ✓ Tools, equipment, machinery and furniture with rates ✓ Raw material ✓ Supplier ✓ Credit / funding sources ✓ Marketing strategy ✓ Market trends ✓ Overall expenses ✓ Profit margin Explain market survey tools such as questionnaire, interview, observation etc Explain elements of business plan	Total: 15hrs Theory: 6hrs Practical: 9hrs	<div style="background-color: #cccccc; padding: 2px;">Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <div style="background-color: #cccccc; padding: 2px;">Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia 	<ul style="list-style-type: none"> • Class Room • Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		<p>State the procedure to fill the business plan format</p> <p>Activity:</p> <ul style="list-style-type: none"> Conduct market survey and formulate business plan in terms of feasibility, investment potential, risk, and completeness. 			
<p>LU 2</p> <p>Collect information regarding funding sources</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate Choose the best available option according to investment requirement Prepare documents 	<p>Explain different funding sources</p> <p>Describe the documents required to get loan to start a new business</p> <p>Activity:</p> <ul style="list-style-type: none"> Prepare the documents for financial feasibility for external investment / loan for the business plan. Prepare loan documents. 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> White board 	<ul style="list-style-type: none"> Class Room Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>according to the loan agreement requirement</p> <p>4. Include the information of funding sources in the business plan</p>			<ul style="list-style-type: none"> Multimedia 	
<p>LU 3</p> <p>Develop a marketing plan</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Collect information required to devise marketing plan Prepare marketing plan for new business 	<p>Prepare the product promotion strategy</p> <ul style="list-style-type: none"> State elements of business plan Describe 7 Ps of marketing Prepare human resource strategy plan. <p>Activity:</p> <ul style="list-style-type: none"> Devise marketing strategy for product promotion 	<p>Total:15hrs</p> <p>Theory:6hrs</p> <p>Practical:9hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> White board Multimedia 	<ul style="list-style-type: none"> Class Room Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 4 Develop basic business communication skills	The trainee will be able to: <ol style="list-style-type: none"> 1. Communicate with internal customers and external customers 2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc. 3. Use specific business terms used in the market 	<ul style="list-style-type: none"> • Describe 7Cs of business communication • Explain different modes of communication and their application in the industry • Describe business terms used in the industry • Describe organization's procedures and policy related to information and communication systems, protocol and procedures Activity: <ul style="list-style-type: none"> • Practice to prepare a report about shortage of labor • Practice to play a role to communicate with customer 	Total: 15hrs Theory: 6hrs Practical: 9hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non-Consumable <ul style="list-style-type: none"> • White board • Multimedia 	<ul style="list-style-type: none"> • Class Room • Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		about the product.			



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Module8: Practice Professionalism

Objective of the module: The aim of this module is to get knowledge, skills and understanding to develop portfolio for industry. You can perform internship

Duration: 300 Hours

Theory: 100 Hours

Practice: 200Hours

Credit Hours: 30

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Develop Portfolio for industry	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Select previous assignments for portfolio Work on previous selected assignments for portfolio Compile variety of assignments for portfolio Make Professional Portfolio for industry Develop Digital Portfolio for industry 	<ul style="list-style-type: none"> Describe different styles/format of portfolio Explain the importance of portfolio <p>Activity:</p> <ul style="list-style-type: none"> Compile important assignments Prepare folder for assignments manually Prepare portfolio digitally 	<p>Total 50hrs</p> <p>Theory: 25 hrs.</p> <p>Practical: 25 hrs.</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 	<ul style="list-style-type: none"> Class Room Simulated environment
LU2. Perform Internship	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Prepare for internship 	<ul style="list-style-type: none"> Explain importance of personal grooming for 	<p>Total 250hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks 	<ul style="list-style-type: none"> Class Room Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Personal Presentation • Portfolio Presentation <ol style="list-style-type: none"> 2. Interview preparation 3. Demonstrate Ethics for Internship 4. Identify Industry for internship 5. Perform Internship in Industry <ul style="list-style-type: none"> • Fill the Performa of Internship 6. Report the performance of internship 	<p>professional life</p> <ul style="list-style-type: none"> • Describe the importance of internship • Explain ethics for work/internship <p>Activity:</p> <ul style="list-style-type: none"> • Practice of presentation • Prepare CV for internship • Prepare report on performance of internship • Perform internship 	<p>Theory: 75hrs</p> <p>Practical: 175 hrs.</p>	<ul style="list-style-type: none"> • Pencils • Erasers • Sharpeners <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia 	



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General assessment guidance for “Seed Processing Plant Technician”

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 Seed Processing Plant Technician include:

- Work performances, for example perform seed quality test and tissue culture technique etc.
- Demonstrations, for example operations of advance seed processing machineries etc
- Direct questioning, where the assessor would ask the student how to perform seed quality test and tissue culture technique etc.



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- Paper-based tests, such as multiple choice or short answer questions on seed packaging and storage, manage and supervise the job activities etc.
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Seed Processing Plant Technician include:

- Work products, such as developing entrepreneurial skills, practice professionalism

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 seed quality testing and tissue culture technique is to be assessed and certificated, the assessment should involve performance criteria that are directly related to that documentation activity. An interview about the seed quality testing and tissue culture technique 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.



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Assessment strategy for Seed Processing Plant Technician

This curriculum consists of 08 modules:

Module 1: Operate Advance Seed Processing Machineries

Module 2: Perform Seed Quality Test

Module 3: Perform Seed Packaging and Storage

Module 4: Maintain Inventory for Seed Processing

Module 5: Prepare Plantlets by Tissue Culture Technique

Module 6: Manage and Supervise the Job Activities

Module 7: Develop Entrepreneurial Skills

Module 8: Practice Professionalism

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



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

The assessment teams

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.



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List of Tool, Machinery and Equipment:

SR#	Items/Tools & Equipment	Quantity
1.	PPEs: Safety Helmet Safety Shoes Gloves Goggles Face Shields.	30 30 Pans 30 05
2.	First Aid Kit	01
3.	Computer	26
4.	Multimedia	01
5.	Clip Board	30



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6.	Scalper	10
7.	Dehumidifier	02
8.	Grain separator cleaning machine	02
9.	Sheller	02
10.	Air classifier	02
11.	Dehullers	02
12.	Management and maintenance tools	05
13.	Destoner	01
14.	Seed sorter	01
15.	Color sorting machine	01
16.	Seed treatment machines	01



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17.	Packaging machines	05
18.	Debearder	01
19.	Seed Scarifier	02
20.	Screen cleaner	05
21.	Vibratory separator	05
22.	Spiral seed grader	02
23.	Disc intuited	01
24.	Electronic separator	01
25.	Inclined separator	01
26.	Magnetic separator	01
27.	Roll milling	01



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28.	Gravity separator	01
29.	Friction cleaner	01
30.	Drum pre cleaner	02
31.	Air screen cleaner with gravity table.	01
32.	Polishing machine bean & grain	02
33.	Corn germ extraction machine.	02
34.	Peeling machine	02
35.	Air suction separator	02
36.	ELISA equipment	01
37.	ELISA reader	01
38.	Strapping/Bundling Machines	01



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39.	Stretch Wrapping Machines	01
40.	Air Pillow Machines	01
41.	Flow wrapper	01
42.	Strapping Machine	01
43.	Accumulator	01
44.	Bag openers	01
45.	Capping Machine	01
46.	Valve bagger machine	01
47.	Compression bagger	01
48.	Vaccume sealer	01
49.	Thermometer	05



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50.	Hygrometer	05
51.	Sprayers	25
52.	Fumigator	05
53.	Autoclave	02
54.	Dry heat oven	02
55.	Aluminium tray	As per requirement
56.	Weighing Balance	05
57.	Constant temperature precision hot-air electric oven.	02
58.	Management and maintenance tools	As per requirement
59.	Micro pipette set	03 set
60.	Accelerated aging chamber	02



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List of Consumable Supplies

SR#	Consumable Supplies	Quantity
1.	PPEs Surgical Face Masks	2 Boxes
2.	Stationary	As per requirement
3.	Tetrazolium solution	As per requirement
4.	Germination Paper	As per requirement
5.	Germination Towel	As per requirement
6.	Wire mesh	As per requirement
7.	Tight jar	As per requirement
8.	Muslin cloth	As per requirement



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9.	Sandmarker brick gravel of 2-3 mm size	As per requirement
10.	Field soil	As per requirement
11.	Sample job order	As per requirement
12.	Safety sign boards	As per requirement
13.	Equipment for germination test	As per requirement
14.	ELISA Kits	15
15.	Tips (Blue, Yellow, White)	As per requirement
16.	ELISA plates	As per requirement
17.	Chemicals	As per requirement



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Members of the Curriculum Development Committee

S#	Name	Designation
1	Muhammad Ishaq	Deputy Director (TE) Coordinator/ NAVTTC HQ
2	Ms. Saima Asghar	DACUM Expert, Lahore
3	Mr. Awais Waheed	Research Associate, Agriculture University Rawalpindi
4	Dr. Sumaira Maqsood	Associate Professor/ Institute of Agricultural Sciences, Punjab University, Lahore
5	Mr. Amir Rehman	Assistant Director, KPK Seed Corporation, Peshawar KPK



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6	Mr. Muhammad Seed Ahmad	Agriculture Officer, UVAS,Pattoki
7	Ms. Hina Ashraf	PhD Scholar, Punjab University, Lahore
8	Ms. Iqra Haider Khan	PhD Scholar, Punjab University, Lahore
9	Mr. Tariq Ullah	Lecturer. GCT D.I.Khan,KPK TEVTA
10	Mr. Abid Mahmood	Scientific officer, Agriculture Department, KPK Peshawar, (Representative of KPK TEVTA)
11	Mr. Muzamil Usman	Consultant for Green House/ Off Season vegetables production, Lahore
12	Mr. Khawar Hameed Alvi	Seed research and quality manager, VentusAgro Ltd Lahore



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13	Mr. Muhammad Asif	Master trainer/ off season vegetables production lahore
14	Ms. Hadia Maqsood	IAGS, Punjab University, Lahore
15	Ms. Zunera Rana	CBT certified Assessor, MBD



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2	Ms. Saima Asghar	DACUM Expert, Lahore
3	Mr. Awais Waheed	Research Associate, Agriculture University Rawalpindi.
4	Dr. Sumaira Maqsood	Associate Professor / Institute of Agricultural Sciences; Punjab University, Lahore
5	Mr. Amir Rehman	Assistant Director, KPK Seed Corporation , Peshawar KPK



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6	Mr. Muhammad Saeed Ahmed	Agriculture Officer, UVAS, Pattoki
7	Ms. Hina Ashraf	PhD Scholar, Punjab University, Lahore
8	Ms. Iqra Haider Khan	PhD Scholar, Punjab University, Lahore
9	Ms. Hamna	Seed Technician, Ayub Research Faisalabad
10	Dr Muhammad Naazir Khan Niazi	Chairman, PBTE Lahore
11	Mr. Abid Mahmood	Scientific Officer, Agriculture Department, KPK Peshawar, (Representative of KPK TEVTA)
12	Mr. Muhammad Ismail	AD, Training, PTEVTA, Lahore



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13	Mr. Khawar Hameed Alvi	Seed Research & Quality Manager, VentusAgro Ltd Lahore
14	Mr. Muhammad Asif	Master Trainer/off season Vegetables production Lahore
15	Ms. Zunera Rana	CBT certified Assessor, MBD