



Tunnel Farming, Green House & Agribusiness

National Vocational Qualification level – 2

“Tunnel Farming, Green House & Agribusiness”

(Off-season Vegetable production & Agribusiness)



(Curriculum)

National Vocational and Technical Training Commission (NAVTTTC)
Government of Pakistan



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1. Introduction

Agriculture is considered as the backbone of Pakistan's economy, which accounts for about 18.9% of Pakistan's GDP and employs about 42.3% of the labor force. Where agriculture is considered as the largest sector that supports GDP, horticulture sector (fruit and vegetables) contributes only 11 % to the total value addition. Pakistan exports vegetables to Afghanistan, Malaysia, Russia, Bahrain, UAE and Sri Lanka but not impressive figures. Despite favorable climatic and cropping condition Pakistan has repeatedly seen shortages of different vegetables like onions or tomatoes in the market that caused price rise and difficulty for many people. More than 35 varieties of vegetables are growing in different climatic zones in different provinces of Pakistan. Many Surveys reports different reasons for low production of vegetables in Pakistan. The government in history executed various projects to urge the farmer community for cultivation of vegetables but due to lack of technical skills and limited resources, farmers have not adopted this sector in a very impressive way.

Vegetable production can be heightening by improving cultivation techniques and enhancing profitability for farmers. Off-season vegetable production is also an important technique to enhance profits and meet market demand. Production of vegetables out of normal season through different techniques is called “off-season vegetable”. Growing Off-season vegetables not only provides fresh vegetables to the daily dietary meal of the consumers but also helps farmers to get abnormal profit as supply in the off-season is always lower than that of its demand.

Therefore, the importance of knowledge related to off-season vegetable production through the latest techniques makes this diploma very valuable not only in agriculture but also in its usefulness in all areas of our daily life. Market demands for qualified workers are therefore a need for time and can only be addressed by developing specific skills standards in partnership with all stakeholders and industry experts. Recognizing this fact, the National Vocational and Technical Training Commission (NAVTTTC) has developed the National Vocational Qualifications Framework (NVQF) for tunnel farming, Greenhouse and agri. Business (off season vegetable production) qualifications. These competency standards have been developed by the Qualification Development Committee (QDC) and validated by the Qualification Validation Committee (QVC) with representation from the country's leading departments (IAGS, PU Lahore, UVAS, UAF, PCSIR and ARI KPK).



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2. Purpose of the training program:

The aim of this qualification is to set high and applicable professional standards for all stake holders in agriculture sector. The basic goals of establishing these credentials are as follows:

1. Equip with the latest off-season vegetable production techniques
2. Improve trainees' professional competence
3. Provide opportunities for recognition of non-formal or informal skills
4. Raise standard and efficacy of scientific training and assessment
5. Improve crop production through the best management skills
6. Enable the existing workforce to learn new technologies and methods
7. Producing a skilled workforce for off-season vegetable production

3. Overall objectives of training program:

The main objectives of the Tunnel Farming, Greenhouse & Agribusiness (Level-2) are as follows:

1. Operate equipment/machinery used in off season vegetable production
2. Perform basic field operations for off season vegetable production
3. Identify Produce Maturity
4. Perform Harvesting
5. Perform Sorting and Grading
6. Maintain Clean and efficient workplace
7. Adopt Safety Regulations, Labor Protection Laws, Environmental Protection Laws at Workplace



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8. Perform Personal Health and Safety Guidelines
9. Apply Work Health and Safety Practices (WHS)
10. Contribute to Work Related Health and Safety (WHS) Initiatives

4. Competencies to be gained after completion of course:

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

National Qualification in the Tunnel Farming, Greenhouse & Agribusiness (Level-2).

1. Operate equipment/machinery used in off season vegetable production
2. perform basic field operations for off season vegetable production
3. Identify produce maturity
4. Perform harvesting
5. Perform Sorting and Grading

5. Entry level of trainees:

The entry for National Vocational Certificate level 2, in “**Tunnel Farming, Greenhouse & Agribusiness**” are given below:

Title	Entry requirements
National Vocational Certificate level 2, in Tunnel Farming, Greenhouse & Agribusiness	Entry for assessment for this qualification is open. However, entry into formal training institutes, based on this qualification is candidate having SSC



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6. Minimum qualification of trainer/instructor:

- Must be a holder of Bachelor of Engineering in Agricultural Engineering/ B.Sc. (Hons.) Agriculture/equivalent or Bachelor of Technology in Agricultural Engineering (with three years of experience)
- Must be able to communicate effectively both orally and in written form.
- Must be able to perform all competences, given in **Tunnel Farming, Greenhouse & Agribusiness Level-2**

7. Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for this program is 1 trainer for 20 to 25 trainees.

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

Instructions will be in Urdu/ English/ Local language.

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

The distribution of contact hours is given below:

Total	-	600 hours
Theory	-	129 hours (21.5%)
Practical	-	471 hours (78.5%)



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10. Description and structure of the course

Following is the structure of the course:

Code	Competency Standard	Category	Level	Theory	Practical	Total contact hours	Credit
CS1	Operate equipment/machinery used in off season vegetable production	Technical	2	24	96	120	12
CS2	perform basic field operations for off season vegetable production	Technical	2	22	78	100	10
CS3	Identify produce maturity	Technical	2	22	78	100	10
CS4	Perform harvesting	Technical	2	22	78	100	10
CS5	Perform Sorting and Grading	Technical	2	14	66	80	8
CS6	Maintain Clean and efficient workplace	Generic	2	5	15	20	2
CS7	Adopt Safety Regulations, Labor Protection Laws, Environmental Protection Laws at Workplace	Generic	2	5	15	20	2



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CS8	Perform Personal Health and Safety Guidelines	Generic	2	5	15	20	2
CS9	Apply Work Health and Safety Practices (WHS)	Generic	2	5	15	20	2
CS10	Contribute to Work Related Health and Safety (WHS) Initiatives	Generic	2	5	15	20	2
	Total			129	471	600	60
	Percentage (%)			21.5	78.5		



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Level 2

Module 1: Operate equipment/machinery used in off season vegetable production

Objective: After the completion of this module, the trainee will be able to identify different equipment/machinery used to perform various field operation in off season vegetable production.

Duration: 120 Hours

Theory: 24 Hours

Practice: 96 Hours

Credit Hours: 12

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Perform operation using different implements	Trainee will be able to: <ul style="list-style-type: none"> Identify and arrange tools for required task Perform operation of chisel plough according to SOP Identify standard operation of disc plough Perform process of bar harrow according to SOP Identify standard process of 	Knowledge based questions <ul style="list-style-type: none"> Define tillage. Describe different types of tillage operations. Enlist tillage implement. Discuss use of Disc Plough, Bar Harrow and 	Theory-5 Hrs Practical-23 Hrs Total-28 Hrs	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Disc plough Bar Harrow Rotavator 	Class Room Training Workshop Field Visit



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	<p>Rotavator</p> <ul style="list-style-type: none"> Adhere to required safety standards. 	<p>Rotavator.</p> <p><u>Practical Activity:</u></p> <p>Make a group of 5 students and perform Tillage operations.</p>			
<p>LU2.</p> <p>Operate farm machinery</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify standard working of tractor engine Identify process involved in different power tools Perform different operation using tractor (ploughing, planking, spraying etc.) Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Describe mechanism of engine. Enlist different types of plough. Differentiate between ploughing and planking. <p><u>Practical Activity:</u></p> <p>Make a group of 5 students and perform ploughing.</p>	<p>Theory-5 Hrs</p> <p>Practical-23 Hrs</p> <p>Total-28 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Chisel Plough Mould-Board Plough Disc Plough Subsoil Plough 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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<p>LU3.</p> <p>Identify and operate equipment used for IPM and nutrition management</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify equipment used for integrated pest management Identify equipment used for nutrition management Operate insect pest management equipment according to defined methods Apply nutrients according to defined methods for optimum growth. Ensure required health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Define IPM Enlist equipment used for IPM Discuss general management of insect Enlist micro and macro nutrients. Explain nutrient application methods. <p><u>Practical Activity:</u></p> <p>Conduct field visit and make a report on IPM and nutrient management.</p>	<p>Theory-3 Hrs</p> <p>Practical-16 Hrs</p> <p>Total-19 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Charts and Markers Weather monitoring equipment Pheromone traps Sticky Papers Light traps Spray Tank Agitator Nutrition Chart Plant Growth Regulators Micro nutrients and fertilizers 	<p>Class Room</p> <p>Training Workshop</p> <p>Lab/ Field Visit</p>
<p>LU4.</p> <p>Perform operations using land and media preparation</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify implements involved in land preparation Identify tools involved in media 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Enlist Land Preparation Implements 	<p>Theory-3 Hrs</p> <p>Practical-12 Hrs</p> <p>Total-15 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p>



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implements	<p>preparation</p> <ul style="list-style-type: none"> • Perform media preparation. • Perform land leveling. • Operate Bed shaper/Ridger as per crop requirements. • Ensure health and safety standards. 	<ul style="list-style-type: none"> • Discuss different types of growth media • State methods for media preparation • Define Land leveling and its advantages • Differentiate between various types of beds <p>Practical Activity:</p> <ul style="list-style-type: none"> • Prepare Media for optimum plant growth • Perform land preparation operations. 		<ul style="list-style-type: none"> • Petri Dishes • Auto clave • Bed shaper 	Lab/ Field Visit
<p>LU5.</p> <p>Operate management and maintenance tools</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Identify management and maintenance tools for off season vegetables • Perform operations for off season vegetable management. • Ensure maintenance of tools as per standard procedures. • Ensure health and safety 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Discuss operations and maintenance of tools for off season vegetables. <p>Practical Activity:</p> <p>Perform cultural practices for off</p>	<p>Theory-3 Hrs</p> <p>Practical-10 Hrs</p> <p>Total-13 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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	standards.	season vegetable production.			
<p>LU6.</p> <p>Operate harvesting tools</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify harvesting tools Operate harvesting tools Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Define harvesting. Enlist Harvesting tools. Explain harvesting methods. (Manual and Mechanical) <p><u>Practical Activity:</u></p> <p>Perform identification of tools for harvesting.</p>	<p>Theory-3 Hrs</p> <p>Practical-7 Hrs</p> <p>Total-10 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Thumb Knife Pyramid double edge sickle Secateur Fruit Pickers. 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>
<p>LU7.</p> <p>Maintain health and safety at workplace</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify health and safety hazards/risks. Manage personal hygiene at workplace. Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Describe health and safety procedure. Enlist PPE's <p><u>Practical Activity:</u></p>	<p>Theory-2 Hrs</p> <p>Practical-5 Hrs</p> <p>Total-7 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Lab/ Field Visit</p>



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		Demonstrate the use of PPE's.			
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<p>LU2.</p> <p>Perform Planking</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Identify and arrange tools for planking • Ensure standard safety checks before and after use of machinery • Fix implements for planking according to SOPs • Ensure cleanliness before and after use • Ensure safety standards involved in the process 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Describe Planking • Enlist implements for planking • Discuss pre and post cleaning practices for machinery <p><u>Practical Activity:</u></p> <p>Conduct field visit and perform planking</p>	<p>Theory-5 Hrs</p> <p>Practical-18 Hrs</p> <p>Total-23 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes • Planker 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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<p>LU3.</p> <p>Perform operation through Laser Land Leveler</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Calibrate implement as per standard method • Ensure safety checks before and after use of machinery • Fix laser land leveler unit according to standard method • Operate laser land leveler according to standard method • Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Define Calibration • Describe procedures involved in laser land leveling. • Explain different components of laser land leveler • Discuss the advantages of laser land leveler <p><u>Practical Activity:</u></p> <p>Perform Laser land leveling.</p>	<p>Theory-5 Hrs</p> <p>Practical-17 Hrs</p> <p>Total-22 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes • Laser land leveler 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>
<p>LU4.</p> <p>Perform management operations</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Perform weeding as per standard operation method • Perform spraying as per required method • Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Define Weeding • Explain methods of weeding. • Explain methods of spraying. 	<p>Theory-5 Hrs</p> <p>Practical-20 Hrs</p> <p>Total-25 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes • Sprayer • Hand Weeder 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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		<p><u>Practical Activity:</u></p> <p>Perform effective management of weeds using spray method</p>			
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Module 3: Identify Produce Maturity

Objective: After the completion of this module, the trainee will be able to identify produce maturity and maturity indices. The learning units consist of terminal performance objective and related technical knowledge necessary to carry out the task in a competent manner.

Duration: 100 Hours

Theory: 22 Hours

Practice: 78 Hours

Credit Hours: 10

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare work plan for produce maturity.	Trainee will be able to: <ul style="list-style-type: none"> Prepare a plan for the required task Select appropriate time for identification of produced maturity as per recommendation Identify and arrange requisite tools as per the job requirements Select and use required Personal Protective Equipment 	Knowledge based questions <ul style="list-style-type: none"> Define produce maturity. Describe factors affecting produce maturity. Enlist tools used to determine produce maturity. <p><u>Practical Activity:</u></p> Prepare a work plan to	Theory-7 Hrs Practical-23 Hrs Total-30 Hrs	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Charts and markers 	Class Room Training Workshop Lab



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	(PPE) as per the recommendation	determine produce maturity.			
<p>LU2.</p> <p>Identify maturity indices</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify the indices to determine the produce maturity as per the crop and recommended standards Identify the appropriate stage of maturity and ripening to avoid possible disorders to the produce as per the set criteria Identify proper harvesting time to increase the shelf life of the produce as per the crop requirement Check physical parameters (size, shape, color, appearances, texture and lenticel number as per the 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Define maturity indices. Describe possible loss due to over ripening of produce. Enlist some physical parameters which help to detect maturity. <p><u>Practical Activity:</u></p> <p>Visit a tunnel farm and identify mature produce also check physical parameters of produce.</p>	<p>Theory-5 Hrs</p> <p>Practical-18 Hrs</p> <p>Total-23 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes Organoleptic tools Color meter Texture meter Refractometer 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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	<p>requirements</p> <ul style="list-style-type: none"> • Check chemical parameters (specific gravity, starch content, total soluble solids, sugar to acid ratio and oil content) as per standard • Identify organoleptic properties for maturity as per the recommendation 				
<p>LU3.</p> <p>Identify physiological maturity</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Identify the appropriate stage for recording physiological maturity of each crop as per the recommendation • Identify the indices to determine the physiological maturity as per the crop and recommended standards. • Distinguish the physiological maturity of climacteric and non-climacteric fruits and vegetables 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Define Physiological maturity • Describe indices to measure physiological maturity • Differentiate between physiological maturity of climacteric and non-climacteric fruits <p><u>Practical Activity:</u></p>	<p>Theory-5 Hrs</p> <p>Practical-17 Hrs</p> <p>Total-22 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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	<p>as per the criteria</p> <ul style="list-style-type: none"> • Maintain the data record as per the recommendation • Follow health and safety rules 	<p>Visit field to measure maturity indices of vegetable crops</p>			
<p>LU4.</p> <p>Identify Commercial maturity</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Identify the appropriate time/stage for recording commercial maturity as per the crop and market recommended standards • Identify the indices to determine the commercial maturity as per the crop and market recommended standards • Distinguish the commercial maturity of climacteric and non-climacteric fruits and vegetables as per the criteria • Maintain records • Follow health and safety rules. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Define commercial maturity • Describe indices to determine commercial maturity • Differentiate between commercial maturity and physiological maturity <p><u>Practical Activity:</u></p> <p>Conduct a field visit and discuss with farm owners about commercial maturity and write a report on their reviews.</p>	<p>Theory-5 Hrs</p> <p>Practical-20 Hrs</p> <p>Total-25 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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Module 4: Perform Harvesting

Objective: After the completion of this module, the trainee will be able to perform operations in harvesting of mature crop and post harvesting activities. Each task consists of terminal performance objective and related technical knowledge necessary to carry out the task in a professional manner.

Duration: 100 Hours

Theory: 22 Hours

Practice: 78 Hours

Credit Hours: 10

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare materials for harvesting	Trainee will be able to: <ul style="list-style-type: none"> • Select appropriate time for harvesting of produce at its maturity as per recommendation • Identify and arrange required tools and equipment as per the job requirements • Prepare a plan for required task as per the job requirement 	Knowledge based questions <ul style="list-style-type: none"> • Define harvesting. • Enlist required tools for harvesting. • Discuss different harvesting materials according to the produce. 	Theory-5 Hrs Practical-19 Hrs Total-24 Hrs	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes 	Class Room Training Workshop Lab/ Field Visit



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	<ul style="list-style-type: none"> Select and use required Personal Protective Equipment (PPE) as per the recommendation 	<p><u>Practical Activity:</u></p> <p>Conduct a field visit and write a report on harvesting tools.</p>			
<p>LU2.</p> <p>Record harvest index</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify the appropriate time/stage for recording harvest index Identify the indices to determine the harvest index as per the crop and market recommended standards Maintain the records Follow health and safety rules 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Define Harvest Index. Describe the procedures involved in calculation of harvest index. <p><u>Practical Activity:</u></p> <p>Conduct a field visit and calculate harvesting index.</p>	<p>Theory-6 Hrs</p> <p>Practical-20 Hrs</p> <p>Total-26 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Lab/ Field Visit</p>
<p>LU3.</p> <p>Perform pre-harvesting steps</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> Identify the pre-harvesting factors (environmental, cultural practices and physiological components) affecting post-harvest quality as per market 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> Describe factors affecting harvesting. Enlist the required harvesting materials. Define pesticide residue 	<p>Theory-5 Hrs</p> <p>Practical-16 Hrs</p> <p>Total-21 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Lab/ Field Visit</p>



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	<p>requirement</p> <ul style="list-style-type: none"> • Prepare for harvesting work as per standard requirements • Shift the required tools and equipment for harvesting to the site • Ensure harvesting machinery is working • Monitor the pesticide residue intervals (PRI) before the harvesting time as per the standards of F&V • Arrange required transport for shifting of harvested produce to the market 	<p>intervals.</p> <p><u>Practical Activity:</u></p> <p>Conduct a field visit and prepare work plan for harvesting.</p>			
<p>LU4.</p> <p>Perform harvesting</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Arrange the tools and equipment required for the harvesting • Harvest the desired economic part of the crop as per the established criteria 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Describe harvesting process. • Discuss post harvesting procedures. 	<p>Theory-6 Hrs</p> <p>Practical-23 Hrs</p> <p>Total-29 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes 	<p>Class Room</p> <p>Training Workshop</p> <p>Lab/ Field Visit</p>



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	<ul style="list-style-type: none">• Manage the harvested produce to avoid post-harvest losses, as per the requirement• Transfer the harvested crop to the collection site as per the requirements• Clean the tools and equipment and shift to the store as per the SOPs.• Ensure health and safety standards throughout the harvesting process• Dispose undesired, diseased plants and weeds from the tunnels/fields after harvesting as per the recommendation• Clean and store the tools after use as per the recommendation	<p><u>Practical Activity:</u></p> <p>Conduct field visit to perform harvesting.</p>			
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Module 5: Perform Sorting and Grading

Objective: After the completion of this module, the trainee will be able to perform sorting and grading activities. Each task consists of terminal performance objective and related technical knowledge necessary to carry out the task in a professional manner.

Duration: 80 Hours

Theory: 14 Hours

Practice: 66 Hours

Credit Hours: 8

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare materials for sorting and grading	Trainee will be able to: <ul style="list-style-type: none"> Identify the ideal time and place for sorting and grading as per job requirements Identify and arrange required tools and equipment as per requirements Prepare a plan for required tasks Select and use the Personal Protective Equipment (PPE) as per the job requirements. 	Knowledge based questions <ul style="list-style-type: none"> Differentiate between sorting and grading Describe the functioning of tools used in sorting and grading. Enlist PPEs required in sorting and grading process <p><u>Practical Activity:</u></p>	<p>Theory-4 Hrs</p> <p>Practical-18 Hrs</p> <p>Total-22 Hrs</p>	<ul style="list-style-type: none"> Safety goggles Safety harness belt Safety helmet Safety mask Safety Shoes 	Class Room Training Workshop Lab/ Field Visit



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		Prepare a work plan for sorting and grading.			
<p>LU2.</p> <p>Perform sorting at field</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Arrange the tools used in the sorting process as per the requirement. • Follow the process of manual produce sorting as per the requirement at farm • Sort out the produce according to required parameters (diameter, length and shape) • Dispose-off the undesirable/sorted out produce as per the SOP • Clean and store the tools and equipment as per the recommendation • Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Define Manual produce sorting • Enlist tools for sorting process • Discuss dispose-off undesirable produce <p><u>Practical Activity:</u></p> <p>Conduct a field visit and perform sorting</p>	<p>Theory-5 Hrs</p> <p>Practical-24 Hrs</p> <p>Total-29 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes • Roller sorting machine. 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>



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<p>LU3.</p> <p>Perform activities</p> <p>Grading</p>	<p>Trainee will be able to:</p> <ul style="list-style-type: none"> • Identify and arrange the tools and equipment required for grading • Perform grading of the produce manually on the basis of physical characteristics (size, color and shape) as per established criteria • Perform mechanical grading of required produce according to the set criteria • Clean the tools and equipment used after grading as per the SOPs • Ensure health and safety standards. 	<p>Knowledge based questions</p> <ul style="list-style-type: none"> • Enlist tools required for grading • Define Mechanical Grading • Discuss grading process according to physical characteristics of produce • Describe process of pre and post cleaning of grading tools <p><u>Practical Activity:</u></p> <p>Conduct a field visit and perform manual grading</p>	<p>Theory-5 Hrs</p> <p>Practical-24 Hrs</p> <p>Total-29 Hrs</p>	<ul style="list-style-type: none"> • Safety goggles • Safety harness belt • Safety helmet • Safety mask • Safety Shoes • Roller grading machine 	<p>Class Room</p> <p>Training Workshop</p> <p>Field Visit</p>
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11. List of Tool & Equipment:

As mentioned in '**Materials required**' column



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12. Members of the Curriculum Development Committee

S#	Name	Designation
1	Dr. Adnan Zahid	Associate Prof (IAGS,PU, Lahore)
2	Dr. Sumaira Maqsood	Associate Prof (IAGS,PU, Lahore)
3	Ms. Noor ul Ain	M.Phil. Scholar, (IAGS,PU, Lahore)
4	Ms. Hina Ashraf	PhD Scholar (PU, Lahore)
5	Mr. Muhammad Faheem	RA, Arid University Rawalpindi
6	Mr. Muhammad Asif	Master Trainer, off Seasonal Vegetables Lahore



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7	Syeda Tehmeen Fatima	M.Phil. Scholar, (IAGS,PU, Lahore)
8	Abdul Manan Saleem	PhD Scholar
9	Ms. Sana GulDad	Agriculture Department KPK
10	Mr. Farhan Mehmood	Parks and Horticulture Authority, Rawalpindi
11	Ms. Iqra Haider Khan	IAGS,PU, Lahore
12	Ms, Hadia Maqsood	IAGS,PU, Lahore
13	Muhammad Abdul Basit	R&D Manager, Lahore
14	Engr. Aijaz Ahmed Zia	DACUM Facilitator



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15	Mr. Muhammad Ishaq	Deputy Director/ Coordinator – (Skills Standards and Curricula) NAVTTC HQ
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