

**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**HORTICULTURAL NURSERY MANAGEMENT**

**LEVEL 6**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

First published 2019

© 2019, TVET CDACC

All rights reserved. No part of this curriculum may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the TVET CDACC, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the Council Secretary/CEO, at the address below:

**Council Secretary/CEO**

**TVET Curriculum Development, Assessment and Certification Council**

**P.O. Box 15745–00100**

**Nairobi, Kenya**

**Email: info@tvetcdacc.go.ke**

# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement Kenya’s development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this Curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Horticultural sector’s growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 and the Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need toreform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Horticulture Sector Skills Advisory Committee (SSAC), German International Cooperation and Ministry of Agriculture, Livestock and Fisheries have developed this curriculum. TVET CDACC in conjunction with Micro Enterprises Support Programme Trust (MESPT) have reviewed this curriculum and incorporated Food Safety.

This curriculum has been developed following the CBET framework policy; the CBETA standards and guidelines provided by the TVET Authority and the Kenya National Qualification Framework designed by the Kenya National Qualification Authority.

This curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Horticulture SSAC, Food Safety SSASC, expert workers and all those who participated in the development and review of this curriculum.

**CHAIRPERSON,**

**TVET CDACC**

# ACKNOWLEDGEMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support was received from various organizations.

I appreciate NEPAD Planning and Coordinating Agency (NPCA) of the Africa Union Commission and German Ministry of Economic Cooperation and Development (BMZ) through its implementing agency German International Cooperation (GIZ) GmbH which enabled the development of this curriculum through the CAADP ATVET project.

I also appreciate the office of the National Coordinator of GIZ CAADP ATVET Project which was instrumental in the cooperation between the project team, Ministry of Agriculture, Livestock and Fisheries (MoALF) and Ministry of Education.

Much gratitude goes to Micro Enterprises Support Program Trust (MESPT) who initiated the review process and the incorporation of Food Safety in the Curriculum. I acknowledge the Danish International Development Agency (DANIDA) and the European Union (EU) who sponsored the review process.

I recognize with appreciation the role of the Horticulture and Food Safety Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Agriculture sector for their valuable input and all those who participated in the process of developing and reviewing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that workers in Horticultural Nursery Management will acquire competencies that will enable them to perform their work more efficiently.

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

TABLE OF CONTENTS

[FOREWORD ii](#_Toc70079067)

[PREFACE iii](#_Toc70079068)

[ACKNOWLEDGEMENT iv](#_Toc70079069)

[ACRONYMS AND ABBREVIATIONS vi](#_Toc70079070)

[KEY TO UNIT CODE vii](#_Toc70079071)

[COURSE OVERVIEW 8](#_Toc70079072)

[BASIC UNITS OF LEARNING 1](#_Toc70079073)

[COMMUNICATION SKILLS 2](#_Toc70079074)

[NUMERACY SKILLS 5](#_Toc70079075)

[DIGITAL LITERACY 10](#_Toc70079076)

[ENTREPRENEURIAL SKILLS 13](#_Toc70079077)

[EMPLOYABILITY SKILLS 17](#_Toc70079078)

[ENVIRONMENTAL LITERACY 23](#_Toc70079079)

[OCCUPATIONAL SAFETY AND HEALTH PRACTICES 27](#_Toc70079080)

[CORE UNITS OF LEARNING 30](#_Toc70079081)

[HORTICULTURAL NURSERY STRUCTURES SETTING UP 31](#_Toc70079082)

[MOTHER BLOCK ESTABLISHMENT 35](#_Toc70079083)

[PLANTING MEDIA PREPARATION 40](#_Toc70079084)

[POTTED SEEDLINGS PRODUCTION 45](#_Toc70079085)

[VEGETABLE SEEDLINGS PRODUCTION 55](#_Toc70079086)

[HORTICULTURAL NURSERY OPERATIONS SUPERVISION 63](#_Toc70079087)

[HORTICULTURAL NURSERY MANAGEMENT 67](#_Toc70079088)

# ACRONYMS AND ABBREVIATIONS

ATVET Agricultural Technical and Vocational Education and Training

BC Basic Competency

CAADP Comprehensive Africa Agricultural Development Programme

CBET Competency Based Education and Training

CDACC Curriculum Development Assessment and Certification Council

CR Core Competency

CU Curriculum

DANIDA Danish International Development Agency

EMCA Environmental Management and Coordination Act

GIZ German International Cooperation

HO Horticulture Industry

ICT Information Communication Technology

KCSE Kenya Certificate of Secondary Education

KNQA Kenya National Qualifications Authority

MESPT Micro Enterprises Support Programme Trust

MoALF Ministry of Agriculture Livestock and Fisheries

NM Nursery Management

OS Occupational Standard

PPE Personal Protective Equipment

SSAC Sector Skills Advisory Committee

TC Tissue Culture

TVET Technical and Vocational Education and Training

# **KEY TO UNIT CODE**

HO/CU/NM/BC/01/6/B

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# **COURSE OVERVIEW**

This course is designed to equip an individual with competencies for setting up horticultural nursery structures, establishing mother blocks and preparing nursery media. It further aims at equipping the individual with competencies for producing potted, grafted, budded seedlings including vegetable seedlings and hardening Tissue Culture (TC) seedlings. It also entails supervising horticultural nursery operations and managing a horticultural nursery.

The course consists of the following basic and core units of learning:

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factors** |
| HO/CU/NM/BC/01/6/B | Communication skills | 40 | 4 |
| HO/CU/NM/BC/02/6/B | Numeracy skills | 60 | 6 |
| HO/CU/NM/BC/03/6/B | Digital literacy | 60 | 6 |
| HO/CU/NM/BC/04/6/B | Entrepreneurial skills | 100 | 10 |
| HO/CU/NM/BC/05/6/B | Employability skills | 80 | 8 |
| HO/CU/NM/BC/06/6/B | Environmental literacy | 40 | 4 |
| HO/CU/NM/BC/07/6/B | Occupational safety and health practices | 40 | 4 |
| **Total** | | **420** | **42** |

**Core Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factors** |
| HO/CU/NM/CR/01/6/B | Horticultural nursery structures  setting up | 100 | 10 |
| HO/CU/NM/CR/02/6/B | Mother block establishment | 145 | 14.5 |
| HO/CU/NM/CR/03/6/B | Nursery planting media preparation | 150 | 15 |
| HO/CU/NM/CR/04/6/B | Potted horticulturalseedlings production | 130 | 13 |
| HO/CU/NM/CR/05/6/B | Grafted/budded horticultural seedlings production | 145 | 14.5 |
| HO/CU/NM/CR/06/6/B | Vegetable seedlings production | 110 | 11 |
| HO/CU/NM/CR/07/6/B | Tissue culture seedlings hardening | 100 | 10 |
| HO/CU/NM/CR/08/6/B | Horticultural nursery operations supervision | 140 | 14 |
| HO/CU/NM/CR/09/6/B | Horticultural nursery management | 140 | 14 |
|  | Industrial Attachment | 480 | 48 |
| **Total** | | **1640** | **164** |
| **Grand total** | | **2060** | **206** |

The total duration of the course is 2060 hours including 480 hours industrial attachment.

**Entry Requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Secondary Education (KCSE) mean grade C- (minus).

**Or**

1. National Certificate in Horticultural Nursery Management Level 5

**Or**

1. Equivalent qualification as determined by Kenya National Qualifications Authority (KNQA)

**Trainer qualification**

A trainer for this course should have a higher qualification than the level of this course

**Assessment**

The course will be assessed at two levels:

1. **Internal assessment**: conducted continuously by the trainer (internal assessor) who is monitored by an accredited internal verifier.
2. **External assessment:** conducted by an accredited external assessor who is monitored by an accredited external verifier.

The assessors and verifiers are accredited by TVET CDACC which also coordinates external assessment.

**Certification**

An individual will be awarded a Certificate of Competency on demonstration of competence in a unit of competency. To be awarded National Certificate in Horticultural Nursery Management Level 6, an individual must demonstrate competence in all the units of competency.

These certificates will be awarded by TVET CDACC in conjunction with the training provider.

# BASIC UNITS OF LEARNING

**COMMUNICATION SKILLS**

**UNIT CODE:** HO/CU/NM/BC/01/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Communication Skills

**Duration of Unit:** 40 hours

**Unit Description**

This unit covers the competencies required to demonstrate communication skills .It involves, meeting communication needs of clients and colleagues; developing communication strategies, establishing and maintaining communication pathways, conducting interviews, facilitating group discussion and representing the organization.

**Summary of Learning Outcomes**

1. Meet communication needs of clients and colleagues
2. Develop communication strategies
3. Establish and maintain communication pathways
4. Promote use of communication strategies
5. Conduct interview
6. Facilitate group discussion
7. Represent the organization

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Meet communication needs of clients and colleagues | * Communication process * Modes of communication * Medium of communication * Effective communication * Barriers to communication * Flow of communication * Sources of information * Organizational policies * Organization requirements for written and electronic communication methods * Report writing * Effective questioning techniques (clarifying and probing) * Workplace etiquette * Ethical work practices in handling communication * Active listening * Feedback * Interpretation * Flexibility in communication * Types of communication strategies * Elements of communication strategy | * Interview * Written texts |
| 1. Develop communication strategies | * Dynamics of groups * Styles of group leadership * Openness and flexibility in communication * Communication skills relevant to client groups | * Interview * Written texts |
| 1. Establish and maintain communication pathways | * Types of communication pathways | * Interview * Written texts |
| 1. Promote use of communication strategies | * Application of elements of communication strategies * Effective communication techniques | * Interview * Written texts |
| 1. Conduct interview | * Types of interview * Establishing rapport * Facilitating resolution of issues * Developing action plans | * Interview * Written texts |
| 1. Facilitate group discussion | * Identification of communication needs * Dynamics of groups * Styles of group leadership * Presentation of information * Encouraging group members participation * Evaluating group communication strategies | * Interview * Written texts |
| 1. Represent the organization | * Presentation techniques * Development of a presentation * Multi-media utilization in presentation * Communication skills relevant to client groups | * Interview * Written texts |

**Suggested Methods of Instruction**

* Discussion
* Role playing
* Simulation
* Direct instruction

**Recommended Resources**

* Desktop computers/laptops
* Internet connection
* Projectors
* Telephone

**NUMERACY SKILLS**

**UNIT CODE:** HO/CU/NM/BC/02/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Numeracy Skills.

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes the competencies required to demonstrate numeracy skills. It involves applying a wide range of mathematical calculations for work; applying ratios, rates and proportions to solve problems; estimating, measuring and calculating measurement for work; using detailed maps to plan travel routes for work; using geometry to draw and construct 2D and 3D shapes for work; collecting, organizing and interpreting statistical data; using routine formula and algebraic expressions for work and using common functions of a scientific calculator.

**Summary of Learning Outcomes**

1. Apply a wide range of mathematical calculations for work
2. Apply ratios, rates and proportions to solve problems
3. Estimate, measure and calculate measurement for work
4. Use detailed maps to plan travel routes for work
5. Use geometry to draw and construct 2D and 3D shapes for work
6. Collect, organize and interpret statistical data
7. Use routine formula and algebraic expressions for work
8. Use common functions of a scientific calculator

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply a wide range of mathematical calculations for work | * Fundamentals of mathematics * Addition, subtraction, multiplication and division of positive and negative numbers * Algebraic expressions manipulation * Forms of fractions, decimals and percentages * Expression of numbers as powers and roots | * Written tests * Assignments * Supervised exercises |
| 1. Apply ratios, rates and proportions to solve problems | * Rates, ratios and proportions * Meaning * Conversions into percentages * Direct and inverse proportions determination * Performing calculations * Construction of graphs, charts and tables * Recording of information | * Written tests * Assignments * Supervised exercises |
| 1. Estimate, measure and calculate measurement for work | * Units of measurements and their symbols * Identification and selection of measuring equipment * Conversion of units of measurement * Perimeters of regular figures * Areas of regular figures * Volumes of regular figures * Carrying out measurements * Recording of information | * Assignments * Supervised exercises * Written tests |
| 1. Use detailed maps to plan travel routes for work | * Identification of features in routine maps and plans * Symbols and keys used in routine maps and plans * Identification and interpretation of orientation of map to North * Demonstrate understanding of direction and location * Apply simple scale to estimate length of objects, or distance to location or object * Give and receive directions using both formal and informal language * Planning of routes * Calculation of distance, speed and time | * Written * Practical test |
| 1. Use geometry to draw and construct 2D and 3D shapes for work | * Identify two dimensional shapes and routine three dimensional shapes in everyday objects and in different orientations * Explain the use and application of shapes * Use formal and informal mathematical language and symbols to describe and compare the features of two dimensional shapes and routine three dimensional shapes * Identify common angles * Estimate common angles in everyday objects * Evaluation of unknown angles * Use formal and informal mathematical language to describe and compare common angles * Symmetry and similarity * Use common geometric instruments to draw two dimensional shapes * Construct routine three dimensional objects from given nets |  |
| 1. Collect, organize and interpret statistical data | * + Classification of data * Grouped data * Ungrouped data   + Data collection * Observation * Recording   + Distinguishing between sampling and census   + Importance of sampling   + Errors in sampling   + Types of sampling and their limitations e.g. * Stratified random * Cluster * Judgmental   + Tabulation of data * Class intervals * Class boundaries * Frequency tables * Cumulative frequency   + Diagrammatic and graphical presentation of data e.g. * Histograms * Frequency polygons * Bar charts * Pie charts * Cumulative frequency curves * Interpretation of data | * Assignments * Supervised exercises * Written tests |
| 1. Use routine formula and algebraic expressions for work | * + Solving linear equations   + Linear graphs * Plotting * Interpretation * Applications of linear graphs * Curves of first and second degree * Plotting * Interpretation | * Assignments * Supervised exercises * Written tests |
| 8. Use common functions of a scientific calculator | * Identify and use keys for common functions on a calculator * Calculate using whole numbers, money and routine decimals and percentages * Calculate with routine fractions and percentages * Apply order of operations to solve multi-step calculations * Interpret display and record result | * Written * Practical test |

**Suggested Methods of Instruction**

* Group discussions
* Demonstration by trainer
* Practical work by trainee
* Exercises

**Recommended Resources**

* Calculators
* Rulers, pencils, erasers
* Charts with presentations of data
* Graph books
* Dice

**DIGITAL LITERACY**

**UNIT CODE:** HO/CU/NM/BC/03/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes competencies required to demonstrate digital literacy. It involves in identifying computer software and hardware, applying security measures to data, hardware, software in automated environment, computer software in solving task, internet and email in communication at workplace, desktop publishing in official assignments and preparing presentation packages.

**Summary of Learning Outcomes**

1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software | * Concepts of ICT * Functions of ICT * History of computers * Components of a computer * Classification of computers | * Written tests * Oral presentation |
| 1. Apply security measures to data, hardware, software in automated environment | * Data security and control * Security threats and control measures * Types of computer crimes * Detection and protection against computer crimes * Laws governing protection of ICT | * Written tests * Oral presentation * Project |
| 1. Apply computer software in solving tasks | * Operating system * Word processing * Spread sheets * Data base design and manipulation * Data manipulation, storage and retrieval | * Oral questioning * Project |
| 1. Apply internet and email in communication at workplace | * Computer networks * Network configurations * Uses of internet * Electronic mail (e-mail) concept | * Oral questioning * Written report |
| 1. Apply desktop publishing in official assignments | * Concept of desktop publishing * Opening publication window * Identifying different tools and tool bars * Determining page layout * Opening, saving and closing files * Drawing various shapes using DTP * Using colour pellets to enhance a document * Inserting text frames * Importing and exporting text * Object linking and embedding * Designing of various publications * Printing of various publications | * Oral questioning * Written report * Project |
| 1. Prepare presentation packages | * Types of presentation packages * Procedure of creating slides * Formatting slides * Presentation of slides * Procedure for editing objects | * Oral questioning * Written report * Project |

**Suggested Methods of Instruction**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practical work by trainee
* Viewing of related videos
* Project
* Group discussions

**Recommended Resources**

* Computers
* Printers
* Storage devices
* Internet access

**ENTREPRENEURIAL SKILLS**

**UNIT CODE:** HO/CU/NM/BC/04/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Entrepreneurial Skills

**Duration of unit:** 100 hours

**Unit Description**

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

**Summary of Learning Outcomes**

* 1. Demonstrate understanding of who an entrepreneur
  2. Demonstrate knowledge of entrepreneurship and self-employment
  3. Identify entrepreneurship opportunities
  4. Create entrepreneurial awareness
  5. Apply entrepreneurial motivation
  6. Develop business innovative strategies
  7. Develop Business plan

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Demonstrate knowledge of entrepreneurship and self-employment | * Importance of self-employment * Requirements for entry into self-employment * Role of an Entrepreneur in business * Contributions of Entrepreneurs to National development * Entrepreneurship culture in Kenya * Born or made entrepreneurs | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report |
| 1. Identify entrepreneurship opportunities | * Business ideas and opportunities * Sources of business ideas * Business life cycle * Legal aspects of business * Assessment of product demand * Business environment * Factors to consider when evaluating business environment * Technology in business | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Create entrepreneurial awareness | * Forms of businesses * Sources of business finance * Factors in selecting source of business finance * Governing policies on Small Scale Enterprises (SSEs) * Problems of starting and operating SSEs | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Apply entrepreneurial motivation | * Internal and external motivation * Motivational theories * Self-assessment * Entrepreneurial orientation * Effective communications in entrepreneurship * Principles of communication * Entrepreneurial motivation | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Develop business innovative strategies | * Innovation in business * Small business Strategic Plan * Creativity in business development * Linkages with other entrepreneurs * ICT in business growth and development | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 6. Develop Business Plan | * Business description * Marketing plan * Organizational/Management * plan * Production/operation plan * Financial plan * Executive summary * Presentation of Business Plan | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |

**Suggested Methods of Instruction**

* Direct instruction
* Project
* Case studies
* Field trips
* Discussions
* Demonstration
* Question and answer
* Problem solving
* Experiential
* Team training

**Recommended Resources**

* Case studies
* Business plan templates
* Computers
* Overhead projectors
* Internet
* Mobile phone
* Video clips
* Films
* Newspapers and Handouts
* Business Journals
* Writing materials

**EMPLOYABILITY SKILLS**

**UNIT CODE:** HO/CU/NM/BC/05/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Employability Skills

**Duration of Unit:** 80 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

**Summary of Learning Outcomes**

1. Conduct self-management
2. Demonstrate interpersonal communication
3. Demonstrate critical safe work habits
4. Lead a workplace team
5. Plan and organize work
6. Maintain professional growth and development
7. Demonstrate workplace learning
8. Demonstrate problem solving skills
9. Manage ethical performance

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct self-management | * Self-awareness * Formulating personal vision, mission and goals * Strategies for overcoming life challenges * Managing emotions * Emotional intelligence * Assertiveness versus aggressiveness * Expressing personal thoughts, feelings and beliefs * Developing and maintaining high self-esteem * Developing and maintaining positive self-image * Setting performance targets * Monitoring and evaluating performance * Articulating ideas and aspirations * Accountability and responsibility * Good work habits * Self-awareness * Values and beliefs * Self-development * Financial literacy * Healthy lifestyle practices * Adopting safety practices | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Demonstrate interpersonal communication | * Meaning of interpersonal communication * Listening skills * Types of audience * Public speaking * Writing skills * Negotiation skills * Reading skills * Meaning of empathy * Understanding customers’ needs * Establishing communication networks * Assertiveness * Sharing information | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Demonstrate critical safe work habits | * Stress and stress management * Time concept * Punctuality and time consciousness * Leisure * Integratingpersonal objectives into organizational objectives * Resources mobilization * Resources utilization * Setting work priorities * Developing healthy relationships * HIV and AIDS * Drug and substance abuse * Managing emerging issues | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Lead a workplace team | * Leadership qualities * Power and authority * Team building * Determination of team roles and objectives * Team parameters and relationships * Individual responsibilities in a team * Forms of communication * Complementing team activities * Gender and gender mainstreaming * Human rights * Developing healthy relationships * Maintaining relationships * Conflicts and conflict resolution * Coaching and mentoring skills | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Plan and organize work | * Functions of management * Planning * Organizing * Time management * Decision making concept * Task allocation * Developing work plans * Developing work goals/objectives and deliverables * Monitoring work activities * Evaluating work activities * Resource mobilization * Resource allocation * Resource utilization * Proactive planning * Risk evaluation * Problem solving * Collecting, analysing and organising information * Negotiation | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Maintain professional growth and development | * Avenues for professional growth * Training and career opportunities * Assessing training needs * Mobilizing training resources * Licenses and certifications for professional growth and development * Pursuing personal and organizational goals * Managing work priorities and commitments * Recognizing career advancement | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Demonstrate workplace learning | * Managing own learning * Mentoring * Coaching * Contributing to the learning community at the workplace * Cultural aspects of work * Networking * Variety of learning context * Application of learning * Safe use of technology * Taking initiative/proactivity * Flexibility * Identifying opportunities * Generating new ideas * Workplace innovation * Performance improvement * Managing emerging issues * Future trends and concerns in learning | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Demonstrate problem solving skills | * Critical thinking process * Data analysis tools * Decision making * Creative thinking * Development of creative, innovative and practical solutions * Independence in identifying and solving problems * Solving problems in teams * Application of problem-solving strategies * Testing assumptions * Resolving customer concerns | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |
| 1. Manage ethical performance | * Meaning of ethics * Ethical perspectives * Principles of ethics * Ethical standards * Organization code of ethics * Common ethical dilemmas * Organization culture * Corruption, bribery and conflict of interest * Privacy and data protection * Diversity, harassment and mutual respect * Financial responsibility/accountability * Etiquette * Personal and professional integrity * Commitment to jurisdictional laws * Emerging issues in ethics | * Written tests * Oral questioning * Interviewing * Portfolio of evidence * Third party report |

**Suggested Methods of Instruction**

* Demonstrations
* Simulation/Role play
* Group Discussion
* Presentations
* Assignments
* Q&A

**Recommended Resources**

* Computers
* Stationery
* Charts
* Video clips
* Audio tapes
* Radio sets
* TV sets
* LCD projectors

**ENVIRONMENTAL LITERACY**

**UNIT CODE**:HO/CU/NM/BC/06/6/B

**Relationship to Occupational Standards**:

This unit addresses the Unit of Competency : Demonstrate Environmental Literacy

**Duration of Unit:** 40 hours

**Unit Description**

This unit describes the competencies required demonstrate environmental literacy.it involves controlling environmental hazard, controlling environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs, monitoring activities on environmental protection/programs, analysing resource use and developing resource conservation plans.

**Summary of Learning Outcomes**

1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use
4. Evaluate current practices in relation to resource usage
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs
8. Analyze resource use
9. Develop resource conservation plans

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Control environmental hazard | * Purposes and content of Environmental Management and Coordination Act 1999 * Storage methods for environmentally hazardous materials * Disposal methods of hazardous wastes * Types and uses of PPE in line with environmental regulations * Occupational Safety and Health Standards (OSHS) | * Written questions * Oral questions |
| 1. Control environmental Pollution control | * Types of pollution * Environmental pollution control measures * Types of solid wastes * Procedures for solid waste management * Different types of noise pollution * Methods for minimizing noise pollution | * Written questions * Oral questions * Role play |
| 1. Demonstrate sustainable resource use | * Types of resources * Techniques in measuring current usage of resources * Calculating current usage of resources * Methods for minimizing wastage * Waste management procedures * Principles of 3Rs (Reduce, Reuse, Recycle) * Methods for economizing or reducing resource consumption | * Written questions * Oral questions * Role play |
| 1. Evaluate current practices in relation to resource usage | * Collection of information on environmental and resource efficiency systems and procedures, * Measurement and recording of current resource usage * Analysis and recording of current purchasing strategies. * Analysis of current work processes to access information and data * Identification of areas for improvement | * Written questions * Oral questions * Role play |
| 1. Identify Environmental legislations/conventions for environmental concerns | * Environmental issues/concerns * Environmental legislations /conventions and local ordinances * Industrial standard /environmental practices * International Environmental Protocols (Montreal, Kyoto) * Features of an environmental strategy | * Written questions * Oral questions |
| 1. Implement specific environmental programs | * Community needs and expectations * Resource availability * 5s of good housekeeping * Identification of programs/Activities * Setting of individual roles /responsibilities * Resolving problems /constraints encountered * Consultation with stakeholders | * Written questions * Oral questions * Role play |
| 1. Monitor activities on Environmental protection/Programs | * Periodic monitoring and Evaluation of activities * Gathering feedback from stakeholders * Analyzing data gathered * Documentation of recommendations and submission * Setting of management support systems to sustain and enhance the program * Monitoring and reporting of environmental incidents to concerned /proper authorities | * Oral questions * Written tests * Practical test |
| 1. Analyze resource use | * Identification of resource consuming processes * Determination of quantity and nature of resource consumed * Analysis of resource flow through different parts of the process. * Classification of wastes for possible source of resources. | * Written tests * Oral questions * Practical test |
| 1. Develop resource Conservation plans | * Determination of efficiency of use/conversion of resources * Causes of low efficiency of use of resources * Plans for increasing the efficiency of resource use | * Written tests * Oral questions * Practical test |

**Suggested Methods of Instruction**

* Instructor led facilitation of theory
* Practical demonstration of tasks by trainer
* Practice by trainees
* Observations and comments and corrections by trainers

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Environmental Management and Coordination Act 1999
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)
* ISO standards
* Company environmental management systems (EMS)
* Montreal Protocol
* Kyoto Protocol

**OCCUPATIONAL SAFETY AND HEALTH PRACTICES**

**UNIT CODE:** HO/CU/NM/BC/07/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Occupational Safety and Health Practices

**Duration of Unit:** 40 hours

**Unit Description**

This unit specifies the competencies required to demonstrate occupational health and safety practices. It involves identifying workplace hazards and risk, identifying and implementing appropriate control measures to hazards and risks and implementing OSH programs, procedures and policies/guidelines.

**Summary of Learning Outcomes**

1. Identify workplace hazards and risk
2. Control OSH hazards
3. Implement OSH programs

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify workplace hazards and risks | * Identification of hazards in the workplace and/or the indicators of their presence * Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace * Gathering of OSH issues and/or concerns | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Control OSH hazards | * Prevention and control measures e.g. use of PPE * Risk assessment * Contingency measures | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Implement OSH   programs | * Company OSH program, evaluation and review * Implementation of OSH programs * Training of team members and advice on OSH standards and procedures * Implementation of procedures for maintaining OSH-related records | * Oral questions * Written tests * Portfolio of evidence * Third party report |

**Suggested Methods of Instruction**

* Assigments
* Discussion
* Q&A
* Role play
* Viewing of related videos

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE) e.g.
* Mask
* Face mask/shield
* Safety boots
* Safety harness
* Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest

# CORE UNITS OF LEARNING

## HORTICULTURAL NURSERY STRUCTURES SETTING UP

**UNIT CODE:** HO/CU/NM/CR/01/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Set up horticultural nursery structures

**Duration of Unit:** 100 hours

**Unit Description**

This unit specifies the competencies required to set up horticultural nursery structures. It involves carrying out food safety risk assessment, developing food safety management plansetting up horticultural nursery structures, evaluating constructed horticultural nursery structures, and completig construction of horticultural nursery structures

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for setting up horticultural nursery structures
2. Prepare to set up horticultural nursery structures
3. Set up horticultural nursery structures
4. Evaluate constructed horticultural nursery structures
5. Complete construction of horticultural nursery structures

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for setting up horticultural nursery structures | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant pre-requisite programmes     - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in food safety in horticultural nursery structures | * Written tests * Oral questioning * Observation * Case study * Third party report * Practical reports | |
| 1. Prepare to set up horticultural nursery structures | * Factors to consider in selecting a nursery site * Nursery plan development * Land preparation * Budgeting * Types of tools and equipment used in nursery structures construction * Sources of funds * Sources of construction materials | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Set up horticultural nursery structures | * Nursery structures designs * Interpretation of nursery structures designs * Nursery Irrigation systems * Construction of nursery structures * Record Keeping | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate set up horticultural nursery structures | * Qualities and standards of good nursery structure * Bill of quantities for each nursery structure * Basic accounting | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete setting of horticultural nursery | * Disposal/recycling of waste materials * Report writing * Record keeping | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * Nursery design/ layout plans * MoALF nursery management manual * Environmental management policy(EMCA) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * PCPB list of registered products | |
| **Materials**   * Land * Green house construction materials * Tunnel construction materials * Shed construction materials * Screen house construction materials * Nursery beds construction materials * Power * Water * Fencing materials | **Tools and equipment**   * Wooden pegs * Measuring tape * Hammer * Sisal twine * Masonry tools * Carpentry tools * Plumbing tools * Hand tools * Personal Protective Equipment (PPE) * Wheel barrows |

## MOTHER BLOCK ESTABLISHMENT

**UNIT CODE:** HO/CU/NM/CR/02/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Establish mother block

**Duration of Unit:** 145 hours

**Unit Description**

This unit specifies the competencies required to establish a horticultural mother block. It involves carrying out food safety risk assessment for establishing mother block, preparing to establish mother block, establishing mother block, evaluating produced propagating materials and completing production of propagating materials

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for establishing mother block
2. Prepare to establish mother block
3. Establish mother block
4. Evaluate produced propagating materials
5. Complete production of propagating materials

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for establishing mother block | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant pre-requisite programmes     - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in mother block establishment | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to establish mother block | * Factors to consider in selecting a mother block site * Soil sampling * Sampling equipment * Sampling methods * Soil results interpretation * Planting mother blocks * Required tools, * equipment, * material and supplies for producing propagating * Sources of planting material * Types of propagating materials * Seeds * Cuttings * Other vegetative materials * Land preparation * Clearing * Ploughing * Landscaping /terracing * Digging planting holes * Sources of planting materials * Record Keeping | * Observation * Written tests * Oral questioning * Third party reports |
| 2. Establish mother block | * Planting of mother stocks * Planting depth * Spacing of the mother stock * Soil analysis report interpretation * Mother stocks nutrient requirement and supply * Mother stocks pruning * Mother stock support/training * Mother stock water requirement and watering methods * Planting materials production Stimulation method * Harvest of planting material * Production schedule * Record Keeping | * Observation * Written tests * Oral questioning * Third party reports |
| 3. Evaluate produce propagating materials | * Farm Planning * Qualities/properties of good planting material | * Observation * Written tests * Oral questions * Third party reports |
| 4. Complete production of propagating materials | * Harvest and post-harvest handling of planting material * Disposal/recycling of waste materials * Report writing * Record keeping | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following Documents   * Ministry of Agriculture Livestock and Fisheries (MoALF)nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * Farm plan * PCPB list of registered products | |
| Materials | Tools and equipment |
| * Land * Pegs * Measuring tape * Panga * Ropes * Soil auger * Paper bags * Personal Protective Equipment (PPE * Spade * Soil probe * Pens * Shovel * Sack * Pruning saw * Secateurs * Measuring jars * Herbicides * Scare crows * Disposal bin * Shading materials * Rooting hormones | * Wheelbarrow * Irrigation equipment * Watering can * Knapsack sprayer * Buckets * Means of transport * Cold store * Bags * Drying paper/   polythene roll   * Labels * Sacks * Planting materials * Trays * Planting trowel * Inorganic fertilizers * Organic manure * Agricultural lime * Quadrant * Pesticides * Fungicides |

## PLANTING MEDIA PREPARATION

**UNIT CODE:** HO/CU/NM/CR/03/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: prepare planting media

**Duration of Unit:** 150 hours

**Unit Description**

This unit specifies the competencies required to prepare planting media. It involves carrying out food safety risk assessment for preparing nursery planting media, preparing to put together planting media, preparing planting media, evaluating the planting media made and completing making planting media

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for preparing nursery planting media
2. Prepare to put together planting media
3. Make planting media
4. Evaluate the planting media made
5. Complete making planting media

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for preparing nursery planting media | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in planting media preparation | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to put together planting media | * Safety and environment management * Tools, equipment, materials and supplies required to make planting media * Planting material media requirement * Types of planting media * Properties/composition of good planting media * Sources of planting media * Record keeping | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Make planting media | * Media sterilization methods:   + Heat   + Chemical   + Biological * Soilless media preparation methods * Sterilizing * Washing * Mixing * Planting media composition * Record keeping | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate the planting media made | * Qualities of good planting media * Farm planning * Basic accounting | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete making planting media | * Planting media potting * Potting materials, tools and equipment * Waste management * Report writing * Record keeping | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * Ministry of Agriculture Livestock and Fisheries (MoALF) nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * Farm plan * PCPB list of registered products | |
| Materials | Tools and materials |
| * Land * Drums * Stirring rod * Crates * Hand trowel * Pots * Canvas | * Means of transport * Heating bars * Injection pumps * pH meter * EC meter * Soil less media * Soil based media * Polythene sheet * Poly bags/pots * Source of heat * Soil sterilizing chemicals * Fertilizers * Agricultural lime   Soil conditioners   * Shakers * Spade * Sacks * Trays * Wheelbarrow * Weighing scale * Personal Protective equipment and clothing (PPE ) |

## 

## POTTED SEEDLINGS PRODUCTION

**UNIT CODE:** HO/CU/NM/CR/04/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce potted seedlings in the horticulture nursery

**Duration of Unit:** 130 hours

**Unit Description**

This unit specifies the competencies required to produce potted seedlings in a horticulture nursery. It involves carrying out food safety risk assessment for production of potted seedlings, producing potted seedlings in the horticulture nursery, evaluating the produced potted seedlings in the horticulture nursery, and completing producing potted seedlings in the horticulture nursery

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for production of potted seedlings Prepare to produce potted seedlings in the horticulture nursery
2. Produce potted seedlings in the horticulture nursery
3. Evaluate the produced potted seedlings in the horticulture nursery
4. Complete producing potted seedlings in the horticulture nursery

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for production of potted seedlings | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant pre-requisite programmes     - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in production of potted seedlings | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to produce potted seedlings in the horticulture nursery | * Sources of planting materials * Tools, equipment, materials and supplies required in producing potted seedlings * Methods of breaking seed dormancy * Land preparation * Seed dressing | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Produce potted seedlings in the horticulture nursery | * Seed sowing: depth and spacing * Cutting’s preparation and rooting * Soil analysis report interpretation * Seedling’s pest and diseases control * Nursery structures maintenance practices * Seedling root pruning * Watering and water requirement for potted seedlings * Nutrient requirement and supply for potted seedlings | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate the produced potted seedlings in the horticulture nursery | * Qualities of good potted seedlings * Farm planting /production schedule * Basic accounting principles | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete producing potted seedlings in the horticulture nursery | * Seedling sorting * Seedlings grading and labelling * Seedling’s packaging and loading * Report writing * Record keeping * Waste management | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * MoALF nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * Farm plan * PCPB list of registered products | |
| Materials | Tools and equipment |
| * Rooting hormone * Soil conditioners * Planting media * Soil conditioners | * Means of transport * Hose pipes * PPE and attire * Measuring gadget * Knapsack sprayer * Waste bins and pits * Watering cans * Trolleys * Water * Soap * Herbicides * Fungicides * Pesticides * Dry mulch * Seeds * Waste bins and pits * Sand * Cuttings * Rooting hormone * Agricultural lime * Pots * Crates * Cartons * Jembe * Panga * Measuring jars * Mixing buckets * Measuring tape * Sampling container * Magnifying glass * Marker pens * Labels * Plastic crates * Waste bins and pit |

**GRAFTED/BUDDED HORTICULTURAL SEEDLINGS PRODUCTION**

**UNIT CODE:** HO/CU/NM/CR/05/6

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce grafted/budded horticultural seedlings

**Duration of Unit:** 145 hours

**Unit Description**

This unit specifies the competencies required to produce grafted/budded horticultural seedlings. It involves carrying out food safety risk assessment for production of grafted/budded seedlings, preparing to produce grafted/budded seedlings, evaluating the produced grafted/budded seedlings and completing producing grafted/budded seedlings in the horticulture nursery

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for production of grafted/budded seedlings
2. Prepare to produce grafted/budded seedlings in the horticulture nursery
3. Produce grafted/budded seedlings in the horticulture nursery
4. Evaluate the produced grafted/budded seedlings
5. Complete producing grafted/budded seedlings in the horticulture nursery

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for production of grafted/budded seedlings | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in production of grafted/budded seedlings | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to produce grafted/budded seedlings in the horticulture nursery | * Required tools, equipment, materials and supplies for producing grafted and budded seedlings * Selection of rootstocks, scions and buds for budding/grafting * Preparation of rootstocks for grafting/budding * Preparation of scions for grafting * Preparation of buds for budding | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Produce grafted/budded seedlings in the horticulture nursery | * Budding   + Reasons for budding   + Budding methods   + Procedures * Grafting   + Reasons for grafting   + Grafting methods   + Procedure * Curing of the grafted/budded seedlings * Grafted/budded seedlings nutrient requirement and supply * Grafted/budded seedlings water requirement and application * Grafted/budded seedling pruning (root and shoots) * Grafted/budded seedlings pest and diseases control * Grafted/budded seedlings weeds control * Nursery structures maintenance practices | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate the produced grafted/budded seedlings | * Signs of a grafting/ budding union healing * Farm planting /production schedule * Basic accounting principles | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete producing grafted/budded seedlings in the horticulture nursery | * Seedling sorting * Seedling’s grading * Seedling’s packaging and loading * Waste management * Report writing * Record keeping | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of Delivery**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * Ministry of Agriculture Livestock and Fisheries (MoALF)nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * Farm plan * PCPB list of registered products | |
| Materials | Tools and equipment |
| * Rootstocks * Scions * Buds * Rooting hormone * Disinfectant/Soap * Herbicides * Fungicides * Pesticides * Dry mulch * Fertilizers * Agricultural lime * Shading materials * Soil conditioners * Water | * Means of transport * Hose pipes * Bench * PPE and attire * Tape/polythene sheet * Grafting wax * Knapsack sprayer * Waste bins and pits * Watering cans * Trolley * Jembe * Panga * Crates * Measuring jars * Mixing buckets * Callipers * Sampling container * Magnifying glass * Secateurs * Marker pens * Labels * Pruning Saw/knife * Sharp blade/knife * Budding knife * Grafting knife * Rope/sisal twine |

## VEGETABLE SEEDLINGS PRODUCTION

**UNIT CODE:** HO/CU/NM/CR/06/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce vegetable seedlings

**Duration of Unit:** 112 hours

**Unit Description**

This unit specifies the competencies required to produce vegetableseedlings. It involves carrying out food safety risk assessment for production of vegetable seedlings, preparing to produce vegetable seedlings, evaluating the produced vegetable seedlings, and completing producing vegetable seedlings

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for production of vegetable seedlings
2. Prepare to produce vegetable seedlings in the horticulture nursery
3. Evaluate the produced vegetable seedlings in the horticulture nursery
4. Complete producing vegetable seedlings in the horticulture nursery

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Outcome** | | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for production of vegetable seedlings | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in production of vegetable seedlings | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to produce vegetable seedlings | | * Sources of clean/certified vegetable seeds * Tools, equipment, materials and supplies required for producing vegetables * Vegetable nursery bed preparation | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate the vegetable seedlings | | * Qualities of good vegetable seedlings * Accounting Principles * Farm planting /production schedule development | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete vegetable seedlings | | * Waste management * Recyclable * Non-recyclable * Seedling sorting * Seedlings grading * Seedlings packaging and loading * Report writing * Record keeping | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * MoALF nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * PCPB list of registered products * Farm plan | |
| Materials | Tools and equipment |
| * Seeds * Fertilizers * shading materials * Agricultural lime * Herbicides * Fungicides * Pesticides * Water * Dry mulch * Waste bins and pits * Sand * Vegetable seeds * Soil conditioners | * Means of transport * Hose pipes * PPE and attire * Measuring gadget * Knapsack sprayer * Waste bins and pits * Watering cans * Trolley * Panga * Crates * Cartons * Measuring jars * Mixing buckets * Measuring tape * Hand hoe * Shovel * Sampling container * Marker pens * Labels * Dibbler * Rope/sisal twine |

**TISSUE CULTURE SEEDLINGS HARDENING**

**UNIT CODE:** HO/CU/NM/CR/07/6

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Harden tissue culture (TC) seedlings

**Duration of Unit:** 100 hours

**Unit Description**

This unit specifies the competencies required to harden tissue culture (TC) seedlings. It involves carrying out food safety risk assessment to harden tissue culture seedlings, preparing to harden Tissue Culture seedlings in the horticulture nursery, evaluating the hardened TC seedlings, and completing hardening TC seedlings

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment to harden tissue culture seedlings
2. Prepare to harden Tissue Culture seedlings in the horticulture nursery
3. Evaluate the hardened TC seedlings in the horticulture nursery
4. Complete hardening of TC seedlings in the horticulture nursery

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment to harden tissue culture seedlings | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in hardening of Tissue Culture seedlings in the horticulture nursery | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to harden Tissue Culture seedlings in the horticulture nursery | * Sources of clean certified Tissue Culture plantlets * Land preparation * Required tools equipment, materials and suppliers for hardening TC seedlings | * Observation * Written tests * Oral questioning * Third party reports |
| 1. Evaluate the harden TC seedlings in the horticulture nursery | * HCDA Phytosanitary requirements * Basic accounting * Qualities of TC seedlings * Preparation of nursery production schedule | * Observation * Written tests * Oral questions * Third party reports |
| 1. Complete producing hardened of TC seedlings in the horticulture nursery | * Seedling sorting * Seedling grading * Seedlings packaging and loading * Nursery waste management   + Recyclable   + Non –recyclable waste * Record Keeping * Report writing | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of Instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |
| --- | --- |
| Functional Nursery with the following:  Documents   * MoALF nursery management manual * Environmental management and Coordination Act (EMCA 1999) * Global Good Agricultural Practices guidelines * KEPHIS guidelines * HCD Checklist * PCPB list of registered products * Farm plan | |
| Materials | Tools and equipment |
| * Disinfectant * Shading materials * Herbicides * Fungicides * Pesticides * Dry mulch * TC Plantlets * Sand * Vegetable seeds * Rooting hormone * Media * Soil conditioners * Fertilizers * Agricultural lime | * Waste bins and pits * Knapsack sprayer * Watering cans * Pots * Jembe * Panga * Crates * Cartons * Measuring jars * Mixing buckets * Measuring tape * Sampling container * Magnifying glass * Marker pens * Labels * Dibbler * Means of transport * Hose pipes * PPE and attire * Measuring gadget * Grease gun * Trolley |

## HORTICULTURAL NURSERY OPERATIONS SUPERVISION

**UNIT CODE:** HO/CU/NM/CR/08/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Supervise horticultural nursery operations

**Duration of Unit:** 140 hours

**Unit Description**

This unit specifies the competencies required to oversee Horticultural nursery operations. It involves carrying out food safety risk assessment for horticultural nursery operations, preparing to supervise Horticultural nursery operations, evaluating supervision of Horticultural nursery and completing supervision of Horticultural nursery.

**Summary of Learning Outcomes**

1. Carry out food safety risk assessment for horticultural nursery operations
2. Prepare to supervise horticultural nursery operations
3. Evaluate supervision of horticultural nursery operations
4. Complete supervision of horticultural nursery operations

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out food safety risk assessment for horticultural nursery operations | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in supervising horticultural nursery operations | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to supervise Horticultural nursery operations | * Strategic planning * Types of plans and their preparation methods. * Basic resources for running a horticultural processing unit * Market assessment methods * Records keeping. * Business operating environment | * Written tests * Observation * Oral questions * Third party report |
| 1. Evaluate supervision of horticultural nursery operations | * Market assessment * Basic accounting * Business monitoring and evaluation * Record keeping | * Written tests * Observation * Oral questions * Third party report |
| 1. Complete supervision of horticultural nursery operations | * Report writing * Performance management * Decision making * Business management * Interpreting management plans | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Industrial attachment
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |  |  |
| --- | --- | --- |
| A properly managed horticultural processing unit with the following: | | |
| Documents:   * Strategic plans * Annual plans * Business operating environment assessment report * Staffing policy * Staff * Finances | | |
| **Tools** | **Materials** | **Equipment** |
| * Performance contracts * Performance appraisal systems | * Stationery * Plans and reports * Policies and legislations | * ICT equipment * Offices |

## HORTICULTURAL NURSERY MANAGEMENT

**UNIT CODE:** HO/CU/NM/CR/09/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Manage horticultural nursery

**Duration of Unit:** 140 hours

**Unit Description**

This unit specifies the competencies required to manage a horticultural nursery. It involves preparing the organizations strategic plan, carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan, sourcing for resources, performing management roles, evaluating performances, advising the stakeholders and evaluating implementation of the food safety management plan.

**Summary of Learning Outcomes**

1. Carry out implementation of the food safety management plan for management of horticultural nursery
2. Prepare to manage horticultural nursery
3. Evaluate management of horticultural nursery
4. Complete management of horticultural nursery

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Carry out implementation of the food safety management plan for management of horticultural nursery | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes * Meaning, importance, categories and establishment of prerequisite programmes * Relevant pre-requisite programmes   + - Good agricultural practices     - Standard Sanitary Operating Procedures * Food safety risk assessment   + Meaning of risk assessment   + Difference between risks and hazards   + Steps to conduct a risk assessment * Enterprise description * Layout of premises and surrounding environment * Product description * Intended uses and consumers * Development of a flow diagram * Hazard assessment * Development of a food safety management system   + Development of the Food safety management plan * Listing hazards * Identifying preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan   + Implementation of the food safety management plan     - Adoption     - Communication     - Resource allocation     - Practices and procedures   + Evaluation of the plan     - Verification     - Validation * Standards and legislations in nursery operations | * Written tests * Oral questioning * Observation * Case study * Third party reports * Practical reports |
| 1. Prepare to manage Horticultural nursery | * Strategic planning * Types of plans and their preparation methods. * Basic resources for running a horticultural processing unit * Market assessment methods * Records keeping. * Business operating environment | * Written tests * Observation * Oral questions * Third party reports |
| 1. Evaluate management of horticultural nursery | * Market assessment * Basic accounting * Business monitoring and evaluation * Record keeping | * Written tests * Observation * Oral questions * Third party reports |
| 1. Complete management of horticultural processing unit | * Report writing * Performance management * Decision making * Business management * Interpreting management plans | * Observation * Written tests * Oral questions * Third party reports |

**Suggested Methods of instructions**

* Project
* Demonstration by trainer
* Practice by the trainee
* Industrial attachment
* Discussions
* Direct instruction
* On job training

**Recommended Resources**

|  |
| --- |
| An efficiently managed horticultural processing unit with the following: |
| * Strategic plans * Business plans * Annual plans * Performance contracts * Performance appraisal systems * Business operating environment assessment report * Staffing policy * Staff * Finances * Stationery * Policies and legislations * Plans and reports * ICT equipment * Offices |