

**THE REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**SOIL MANAGEMENT**

**LEVEL 4**



TVET CDACC

P.O BOX 15745-00100

NAIROBI

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## 

# 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. 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 Soil 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 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 Soil Sector Skills Advisory Committee (SSAC) have developed this curriculum.

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.

The 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, Soil SSAC, expert workers and all those who participated in the development 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 recognize with appreciation the role of the SSAC in ensuring that competencies required by the industry are addressed in this curriculum. I also thank GIZ (Soil Protection and Rehabilitation for Food Security) and all stakeholders in the Soil sector for their valuable input and all those who participated in the process of developing this curriculum.

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

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

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## **ACRONYMNS**

BC Basic competency

CU Curriculum

CC Common competency

CR Core Competency

CDACC Curriculum Development, Assessment and Certification Council

EMCA Environmental management and co-ordination Act

GAP Good agricultural practices

ISO International Organization for Standardization

IPM Integrated pest management

ISFM CA Conservation agriculture

K.C.S.E Kenya Certificate of Secondary Education

KNQA Kenya National Qualification Authority

KNQF Kenya National Qualification Framework

NEMA National Environmental Management Authority

OHSAS Occupational Health and Safety Assessment Series

PPE Personal Protective Equipment

SL Soil

SM Soil Management

SOP Standard Operating Procedures

TVET Technical and Vocational Education and Training

Integrated soil fertility management

# 

# KEY TO UNIT CODE

SL/ CU/ SM/ BC /01 /4/ A

Industry or sector

Curriculum

Occupational area

Type of Unit

Unit number

Competency level

Version control

**COURSE OVERVIEW**

**Description of the course**

This course is designed to equip individuals with competencies required for soil fertility management, conservation agriculture, agroforestry, soil and water conservation

The course consists of basic and core units of learning as indicated below:

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **CREDIT FACTORS** |
| SL/CU/SM/BC/01/4/A | Communication Skills | 20 | 2 |
| SL/CU/SM/BC/02/4/A | Numeracy skills | 25 | 3 |
| SL/CU/SM/BC/03/4/A | Digital Literacy | 35 | 4 |
| SL/CU/SM/BC/04/4/A | Entrepreneurial Skills | 60 | 6 |
| SL/CU/SM/BC/05/4/A | Employability Skills | 30 | 3 |
| SL/CU/SM/BC/06/4/A | Environmental Literacy | 20 | 2 |
| SL/CU/SM/BC/07/4/A | Occupational Safety and Health Practices | 20 | 2 |
|  | **Total** | **210** | **22** |

**Common Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in hrs** | **CREDIT FACTORS** |
| SL/CU/SM/CC/01/4/A | Principles of Agriculture | 70 | 7 |
|  | **Total** | **70** | **7** |

**Core units of learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **CREDIT FACTORS** |
| SL/CU/SM/CR/01/4/A | Soil fertility management | 60 | 6 |
| SL/CU/SM/CR/02/4/A | Conservation Agriculture | 50 | 5 |
| SL/CU/SM/CR/03/4/A | Agroforestry | 100 | 10 |
| SL/CU/SM/CR/04/4/A | Soil and water conservation | 80 | 8 |
|  | Industrial attachment | 240 | 24 |
|  | **Total** | 530 | 53 |
| **GRAND TOTAL** | | **810** | **81** |

The core units of learning are independent of each other and may be taken independently.

The total duration for this course **is 810 hours** including industrial attachment.

**Industrial attachment**

It is envisaged that the trainee will have undergone an industrial training and assessment with a recognised industry as a prerequisite for completion of this training course.

An individual enrolled in this course will be required to undergo a two month industrial attachment with the relevant competency required.

**Entry Requirements**

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

1. Kenya Certificate of Secondary Education (K.C.S.E.) with a minimum mean grade of E

**Or**

1. Soil Management Level 3 Certificate

**Or**

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

**Trainer Q**

**Assessment**

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an internal accredited verifier while external assessment is the responsibility of TVET/CDACC.

**Certification**

A candidate will be issued with a Certificate of competency on demonstration of competence in a unit of competency. To attain the qualification Soil Management Level 4, the candidate must demonstrate competence in all the units of competency as given in qualification pack. These certificates will be issued by TVET CDACC in conjunction with training provider.

# BASIC UNITS OF LEARNING

# 

**COMMUNICATION SKILLS**

**UNIT CODE:** SL/CU/SM/BC/01/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Communication Skills

**Duration of Unit:** 20 Hours

**Unit Description**

This unit covers the competencies required demonstrate communication skills. It involves obtaining and conveying workplace information, completing relevant work-related documents, communicating information about workplace processes, leading workplace discussion and communicating workplace issues.

**Summary of Learning Outcomes**

1. Obtain and convey workplace information
2. Complete relevant work-related documents
3. Communicate information about workplace processes
4. Lead workplace discussions
5. Identify and communicate issues arising in the workplace

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Obtain and convey workplace information | * Communication process * Modes of communication * Medium of communication * Effective communication * Barriers to communication * Flow of communication * Sources of information * Types of questions * Organizational policies * Workplace etiquette * Ethical work practices in handling communication | * Interview * Third party reports |
| 1. Complete relevant work-related documents | * Types and purposes of workplace documents and forms * Methods used in filling forms and documents * Recording workplace data * Process of distributing workplace forms and documents * Report writing * Types of workplace reports | * Interview * Third party reports |
| 1. Communicate information about workplace processes | * 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 | * Interview * Portfolio |
| 1. Lead workplace discussion | * Methods of discussion e.g.   + Coordination meetings   + Toolbox discussion   + Peer-to-peer discussion * Solicitation of response | * Interview * Third party reports |
| 1. Identify and communicate issues arising in the workplace | * Identification of problems and issues * Organizing information on problems and issues * Relating problems and issues * Communication barriers affecting workplace discussions | * Interview * Portfolio |

**Suggested Methods of Instruction**

* Direct instruction
* Demonstration
* Practice assignment
* Discussion
* Role play
* Brainstorming

**Recommended Resources**

* Desktop computers/laptops
* Internet connection
* Projectors
* Telephone
* Report writing templates

**NUMERACY SKILLS**

**UNIT CODE:** SL/CU/SM/BC/02/4/A

**Relationship to Occupational Standards:**

This unit addresses the Unit of Competency: Demonstrate Numeracy Skills

**Duration of Unit:** 25hours

**Unit Description**

This unit covers the competencies required to demonstrate numeracy skills. It involves identifying and using whole numbers and simple fractions, decimals and percentages for work, identifying, measuring and estimating familiar quantities for work, reading and using familiar maps, plans and diagrams for work, identifying and describing common 2D and some 3D shapes for work, constructing simple tables and graphs for work using familiar data and identifying and interpreting information in familiar tables, graphs and charts for work.

**Summary of Learning Outcomes**

1. Identify and use whole numbers and simple fractions, decimals and percentages for work
2. Identify, measure and estimate familiar quantities for work
3. Read and use familiar maps, plans and diagrams for work
4. Identify and describe common 2D and some 3D shapes for work
5. Construct simple tables and graphs for work using familiar data
6. Identify and interpret information in familiar tables, graphs and charts for work

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify and use whole numbers and simple fractions, decimals and percentages for work | * Whole numbers * Simple fractions * Decimals * Percentages * Sizes * Problem solving methods * Calculations using the 4 operations * Recording and communicating numerical information | * Written * Practice assignments |
| 2. Identify, measure and estimate familiar quantities for work | * Measurement information * Units of measurement * Estimate familiar and simple amounts * Selection of appropriate measuring equipment * Calculate using familiar units of measurement * Check measurements and results against estimates * Using informal and some formal mathematical and general language * Record or report results | * Written * Practice assignments |
| 3. Read and use familiar maps, plans and diagrams for work | * Maps, plans and diagrams * Locate items and places in familiar maps, plans and diagrams * Recognize common symbols and keys in familiar maps, plans and diagrams * Direction and location of objects, or route or places * Use of informal and some formal oral mathematical language and symbols | * Practical test * Written |
| 4. Identify and describe common 2D and some 3D shapes for work | * Common 2D shapes and 3D shapes * Classification of common 2D shapes and designs * Description of Use informal and some formal language to describe common two-dimensional shapes and some common three-dimensional shapes * Construction of common 2D shapes * Match common 3D shapes to their 2D sketches or nets | * Written * Practical test |
| 5. Construct simple tables and graphs for work using familiar data | * Types of graphs * Determination of data to be collected * Selection of data collection method * Collection of data * Determination of variables from the data collected * Order and collate data * Construct a table and enter data * Construct a graph using data from table * Check results * Report or discuss graph information related to work using informal and some formal mathematical and general language | * Written * Practical test |
| 6. Identify and interpret information in familiar tables, graphs and charts for work | * Tables construction and labeling * i.e. title, headings, rows and columns * Interpreting information and data in simple tables * Relaying information of relevant workplace tasks on/in a table * Identify familiar graphs and charts in familiar texts and contexts * Locate title, labels, axes, scale and key from familiar graphs and charts * Identify and interpret information and data in familiar graphs and charts * Relate information to relevant workplace tasks | * Written * Practical test |

**Suggested Methods of Instruction**

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

**Recommended Resources**

1. Computers
2. Stationery
3. Charts
4. Video clips
5. Audio tapes
6. LCD projectors

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Projectors
* Writing boards
* Mathematical tables

**DIGITAL LITERACY**

**UNIT CODE:** SL/CU/SM/BC/03/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

**Duration of Unit:** 35 hours

**Unit Description**

This unit covers the competencies required to demonstrate digital literacy in a working environment. It entails identifying computer software and hardware, applying security measures to data, hardware, software, applying computer software in solving task sand applying internet and email in communication at workplace.

**Summary of Learning Outcomes**

1. Identify computer software and hardware
2. Apply security measures to data, hardware and software
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software | * Meaning of a computer * Functions of a computer * Components of a computer * Classification of computers | * Written tests * Oral * Observation |
| 1. Apply security measures to data, hardware and software | * Data security and control * Security threats and control measures * Types of computer crimes * Detection and protection against computer crimes | * Written tests * Oral presentation * Observation * Projects |
| 1. Apply computer software in solving tasks | * Operating system * Word processing * Spread sheets * Data base | * Oral questioning * Observation * Project |
| 1. Apply internet and email in communication at workplace | * Computer networks * Uses of internet * Electronic mail (e-mail) concept | * Oral questioning * Observation * Oral presentation * Written report |

**Suggested Methods of Instruction**

1. Instructor led facilitation of theory
2. Demonstration by trainer
3. Practical assignment
4. Viewing of related videos
5. Project
6. Group discussions

**Recommended Resources**

* Desktop computers
* Laptop computers
* Other digital devices
* Printers
* Storage devices
* Internet access
* Computer software

**ENTREPRENEURIAL SKILLS**

**UNIT CODE:** SL/CU/SM/BC/04/4/A

**Relationship to occupational standards**

This unit addresses the Unit of Competency: Demonstrate Entrepreneurial Skills

**Duration of unit:** 60 hours

**Unit description**

This unit covers the competencies required for creating and maintaining small scale business, establishing small business customer base, managing and growing a micro/small-scale business.

**Summary of Learning Outcomes**

1. Create and maintain small scale business
2. Establish small scale business customer base
3. Manage small scale business
4. Grow/expand small scale business

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Create and maintain small scale business | * Starting a small business * Legal regulatory requirements in starting a small business * SWOT/ PESTEL analysis * Conducting market/industry survey * Generation and evaluation of business ideas * Matching competencies with business opportunities * Forms of business ownership * Location of a small business * Legal and regulatory requirement * Resources required to start a small business * Common terminologies in entrepreneurship * Entrepreneurship in national development * Self-employment * Formal and informal employment * Entrepreneurial culture * Myths associated with entrepreneurship * Types, characteristics, qualities & role of entrepreneurs * History, development and importance of entrepreneurship * Theories of entrepreneurship * Quality assurance for small businesses * Policies and procedures on occupational safety and health and environmental concerns | * Individual/group assignments * projects * Written * Oral |
| 1. Establish small scale business customer base | * Good staff/workers and customer relations * Marketing strategy * Identifying and maintain new customers and markets * Product/ service promotions * Products / services diversification * SWOT / PESTEL analysis * Conducting a business survey * Generating Business ideas * Business opportunities | * Individual/group assignments * projects * Written * Oral |
| 1. Manage small scale business | * Organization of a small business * Small business’ business plan * Marketing for small businesses * Managing finances for small business * Production/ operation process for goods/services * Small business records management * Book keeping and auditing for small businesses * Business support services * Small business resources mobilization and utilization * Basic business social responsibility * Management of small business * Word processing concepts in small business management * Computer application software * Monitoring and controlling business operations | * Oral * Individual/group assignments * projects * Written |
| 1. Grow/expand small scale business | * Methods of growing small business * Resources for growing small business * Small business growth plan * Computer software in business development * ICT and business growth | * Individual/group assignments * projects * Written |

**Suggested Methods of Instruction**

1. Instructor led facilitation of theory
2. Demonstration by trainer
3. Practice by trainee
4. Role play
5. Case study

**Recommended Resources**

* Case studies for small businesses
* Business plan templates
* Lap top/ desk top computer
* Internet
* Telephone
* Writing materials

**EMPLOYABILITY SKILLS**

**UNIT CODE:** SL/CU/SM/BC/05/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Employability Skills

**Duration of Unit:** 30 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics.

**Summary of Learning Outcomes**

1. Conduct self-management
2. Demonstrate critical safe work habits
3. Demonstrate workplace learning
4. Demonstrate workplace ethics

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct self-management | 1. Self-awareness 2. Formulating personal vision, mission and goals 3. Strategies for overcoming life challenges 4. Emotional intelligence 5. Assertiveness 6. Expressing personal thoughts, feelings and beliefs 7. Developing and maintaining high self-esteem 8. Developing and maintaining positive self-image 9. Articulating ideas and aspirations 10. Accountability and responsibility 11. Good work habits 12. Self-awareness 13. Self-development 14. Financial literacy 15. Healthy lifestyle practices | 1. Written tests 2. Oral questioning 3. Portfolio of evidence 4. Third party report |
| 1. Demonstrate critical safe work habits | 1. Stress and stress management 2. Punctuality and time consciousness 3. Interpersonal communication 4. Sharing information 5. Leisure 6. Integratingpersonal objectives into organizational objectives 7. Resources utilization 8. Setting work priorities 9. HIV and AIDS 10. Drug and substance abuse 11. Handling emerging issues | 1. Written tests 2. Oral questioning 3. Portfolio of evidence 4. Third party report |
| 1. Demonstrate workplace learning | 1. Personal training needs identification and assessment 2. Managing own learning 3. Contributing to the learning community at the workplace 4. Cultural aspects of work 5. Variety of learning context 6. Application of learning 7. Safe use of technology 8. Identifying opportunities 9. Workplace innovation 10. Performance improvement 11. Handling emerging issues 12. Future trends and concerns in learning | 1. Written tests 2. Oral questioning 3. Portfolio of evidence 4. Third party report |
| 1. Demonstrate workplace ethics | 1. Meaning of ethics 2. Ethical perspectives 3. Principles of ethics 4. Values and beliefs 5. Ethical standards 6. Organization code of ethics 7. Common ethical dilemmas 8. Organization culture 9. Corruption, bribery and conflict of interest 10. Privacy and data protection 11. Diversity, harassment and mutual respect 12. Financial responsibility/accountability 13. Etiquette 14. Personal and professional integrity 15. Commitment to jurisdictional laws 16. Emerging issues in ethics | 1. Written tests 2. Oral questioning 3. Portfolio of evidence 4. Third party report |

**Suggested Methods of Instruction**

1. Simulation/Role play
2. Group Discussion
3. Presentations
4. Q&A
5. Case studies
6. Assignments

**Recommended Resources**

1. Computers
2. Stationery
3. Charts
4. Video clips
5. Audio tapes
6. Radio sets
7. TV sets
8. LCD projectors

**ENVIRONMENTAL LITERACY**

**UNIT CODE:** SL/CU/SM/BC/06/4/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Environmental Literacy

**Duration of Unit:** 20hours

**Unit Description**

This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution, demonstrating sustainable resource use and evaluating current practices in relation to resource usage.

**Summary of Learning Outcomes**

1. Control environmental hazard
2. Control environmental pollution
3. Demonstrate sustainable use of resources
4. Evaluate current practices in relation to resource usage

**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 * Purposes and content of Solid Waste Act * 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 tests * Oral questions * Observation of work procedures |
| 1. Control environmental Pollution | * 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 tests * Oral questions * Observation of work procedures * 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 tests * Oral questions * Observation of work procedures |
| 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 tests * Oral questions * Observation of work procedures |
| 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 tests * Oral questions * Observation of work procedures |

**Suggested Methods of Instruction**

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

**Recommended Resources**

1. Computers
2. Stationery
3. Charts
4. Video clips
5. Audio tapes
6. Radio sets
7. TV sets
8. LCD projectors

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)

**OCCUPATIONAL SAFETY AND HEALTH PRACTICES**

**UNIT CODE:** SL/CU/SM/BC/07/4/A

**Relationship to Occupational Standards**

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

**Duration of Unit:** 20 hours

**Unit Description**

This unit specifies the competencies required to practice safety and health and comply with OSH requirements relevant to work. It involves adhering to workplace procedures for hazards and risk prevention and participating in arrangements for workplace safety and health maintenance.

**Summary of Learning Outcomes**

1. Adhere to workplace procedures for hazards and risk prevention
2. Participate in arrangements for workplace safety and health maintenance

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment**  **Methods** |
| 1. Adhere to workplace procedures for hazards and risk prevention | * Arrangement of work area and items in accordance with Company housekeeping procedures * Adherence to work standards and procedures * Application of preventive and control measures, including use of safety gears/PPE * Study and apply standards and procedures for incidents and emergencies. | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Participate in arrangements for workplace safety and health maintenance | * Participating in orientations on OSH requirements/regulations of tasks * Providing feedback on health, safety, and security concerns to appropriate personnel as required in a sufficiently detailed manner * Practice workplace procedures for reporting hazards, incidents, injuries and sickness * OSH requirements/ regulations and workplace safety and hazard control procedures are reviewed, and compliance reported to appropriate personnel * Identification of needed OSH-related trainings are proposed to appropriate personnel | * 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**

1. Computers
2. Stationery
3. Charts
4. Video clips
5. Audio tapes
6. Radio sets
7. TV sets
8. LCD projectors

* 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 bootsn
* 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

# COMMON UNITS OF LEARNING

## PRINCIPLES OF AGRICULTURE

**UNIT CODE:** SL/CU/SM/CC/01/4/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Apply principles of agriculture.

**Duration of Unit:**  70 hours

**Unit Description**

This unit describes the competencies required to apply principles of Agriculture .it involves utilizing weather information systems, managing livestock, crops, and keep agricultural records

**Summary of Learning Outcomes**

* + - 1. Utilize weather information systems
      2. Manage livestock
      3. Manage crops
      4. Keep agricultural records

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of assessment** |
| * 1. Utilize weather information systems | * Meaning of weather information systems * Purpose of weather information systems * Sources of weather information * Development of cropping calendar * Early warning systems * Weather instruments * Adaptation to weather change. * Mitigation measures to climate change. | * Observation * Oral questioning * Written tests * Projects |
| * 1. Manage livestock | * Purpose of livestock management * Types of livestock * Livestock management systems   + free range   + intensive   + semi intensive * Livestock breeds * Livestock feeds and fodder * Disease and pest management * Livestock productivity * Management of livestock manure | * Observation * Oral questioning * Written tests * Projects |
| * 1. Manage crops | * Plant varieties * Soil sampling * Importance of plants on soil fertility * Plant nutrition * Establishment and management of plants * Plant diseases and pests * Management of plant diseases and pests * Plant harvesting and post-harvest handling | * Observation * Oral questioning * Written tests * Projects |
| * 1. Keep agricultural records | * Purpose of record keeping * Types of records * Data entry and analysis * Storage of records | * Observation * Oral questioning * Written tests * Projects |

**Suggested Methods of instructions**

* Group discussions
* Lectures
* Demonstration by trainer
* Field trips
* Industrial attachment
* Projects
* Practicals
* Exercises by trainee

**Recommended Resources**

* Farm tools and equipment
* Demo plots
* Agrochemicals
* Surveying tools
* Weather information systems
* Weather instruments
* Farm structures
* Cabinets
* Transport
* Public address systems
* Media
* Calculators
* Stationery
* Computers with internet connection

## CORE UNITS OF LEARNING

## SOIL FERTILITY MANAGEMENT

**UNIT CODE:** SL/CU/SM/CR/01/4/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Manage soil fertility

**Duration of Unit:**  60 hours

**Unit Description**

This unit describes the competencies required to manage soil fertility. It involves managing on-farm residues, preparing organic manure, apply inorganic fertilizer and apply ISFM.

**Summary of Learning Outcomes**

* + 1. Manage on-farm residues
    2. Prepare organic manure
    3. Apply inorganic fertilizer
    4. Apply ISFM

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| * 1. Manage on-farm residues | * Types of on-farm residues * Uses of on farm residues * Processing of farm residues for livestock feeds * Meaning of animal manure   + Types   + Management * Biogas for slurry | * Observation * Oral questioning * Written tests * Projects |
| * 1. Prepare organic manure | * Meaning and importance of organic manure * Types of organic manure   + Compost manure   + Farmyard manure   + Liquid organic manure   + Green manure   + Vermi-compost * Preparation of organic manure * Management of organic manure * Application of organic manure | * Observation * Oral questioning * Written tests * Projects |
| * 1. Apply inorganic fertilizer | * Meaning of fertilizers * Purpose of fertilizers * Types of fertilizers * Fertilizer grades and quality * Plant nutrient requirements * Fertilizer application   + Methods of fertilizer application   + Time of application   + Application rates   + Mixing fertilizers * Effects of fertilizers on the environment. * Safe handling of fertilizers   + Transportation   + Application   + Storage   + Disposal | * Observation * Oral questioning * Written tests * Projects |
| * 1. Apply integrated soil fertility management (ISFM) | * Meaning of ISFM * Benefits of ISFM * Combinations of organic and Inorganic fertilizers * Merits and demerits of organic manures/inorganic fertilizers * Methods of application * Evaluation of ISFM performance. | * Observation * Oral questioning * Written tests * Projects |

**Suggested Methods of instruction**

* Group discussions
* Lectures
* Demonstration by trainer
* Field trips
* Industrial attachment
* Outreach programs
* Projects
* Practicals
* Exercises by trainee

**Recommended Resources**

* Well-equipped Laboratories
* Sampling tools and equipment
* Sampling area
* Fertilizers
* Protective gear
* Shredders
* Chaff cutters
* Scientific Calculators
* Rulers, pencils, erasers
* Charts with presentations of data
* Computers with internet connection

## CONSERVATION AGRICULTURE

**UNIT CODE:** SL/CU/SM/CR/02/4/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Apply conservation agriculture

**Duration of Unit: 50** hours

**Unit Description**

This unit describes the competencies required to apply conservation of agriculture. It involves performing conservation tillage, establishing permanent soil cover, performing crop rotation, managing pests, diseases and weeds and managing on-farm residues.

**Summary of Learning Outcomes**

* + - 1. Perform conservation tillage
      2. Establish permanent soil cover
      3. Perform crop rotation
      4. Manage pests, diseases and weeds
      5. Manage on-farm residues

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| * 1. Perform conservation tillage | * Principles of conservation agriculture * Difference between conservation agriculture and conventional agriculture   + Advantages and disadvantages * Meaning of conservation tillage * Purpose of conservation tillage * Conservation tillage practices   + Zero tillage   + Minimum tillage * Tools and equipment for conservation tillage | * Observation * Oral questioning * Written tests * Projects |
| * 1. Establish permanent soil cover | * Meaning of permanent soil cover * Purpose of soil cover * Types of soil cover   + Mulch   + Cover crops * Establishment and management of cover crops * Tools and equipment | * Observation * Oral questioning * Written tests * Projects |
| * 1. Perform crop rotation | * Meaning of crop rotation * Purpose of crop rotation * Crop types and varieties * Crop rotation plan * Implementation of crop rotation plan | * Observation * Oral questioning * Written tests * Projects |
| * 1. Manage pests, diseases and weeds | * Meaning of pests, diseases and weeds * Integrated pest management * Safe use of agrochemicals | * Observation * Oral questioning * Written tests * Projects |
| * 1. Manage on-farm residues | * Types of on-farm residues * Uses of on farm residues * Animal manure   + Types   + Collection   + Management * Biogas preparation * Compost manure   + Preparation   + Application   + Management | * Observation * Oral questioning * Written tests * Projects |

**Suggested Methods of instruction**

* Group discussions
* Lectures
* Demonstration by trainer
* Field trips
* Industrial attachment
* Outreach programs
* Projects
* Practicals
* Exercises by trainee

**Recommended Resources**

* Assorted seeds
* Demo plots
* Farm tools and equipment
* Protective gear
* Cold rooms
* Stationery
* Botanical gardens
* Arboretum
* Computers with internet connection

## AGROFORESTRY

**UNIT CODE:** SL/CU/SM/CR/03/4/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Apply agroforestry

**Duration of Unit: 100** hours

**Unit Description**

This unit describes the competencies required to apply agroforestry. It involves managing tree seeds, establishing tree nursery, improving tree productivity and establishing agroforestry system

**Summary of Learning Outcomes**

* + - 1. Establish agroforestry systems
      2. Manage tree seeds
      3. Establish tree nursery,
      4. Improve tree productivity

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| 1. Establish agroforestry systems | * Meaning of agroforestry * Importance of agroforestry * Types of agroforestry systems * Farm layout * Tree and crop/animal selection * Management of agroforestry systems   + Agro-silviculture   + Agro-silvopastoralism   + Aqua-silviculture   + Apiculture with forestry   + Silvo-entomology * Utilization of agroforestry products * Value addition * Post-harvest handling of the agroforestry produces and products * Record keeping * Marketing | * Observation * Oral questioning * Written tests * Projects |
| 1. Manage tree seeds | * Sources of tree seeds * Methods of seed collection and handling * Processing of seeds   + Extraction   + Drying   + Cleaning   + Sorting   + Pretreatment   + Seed dressing * Storage of seeds | * Observation * Oral questioning * Written tests * Projects |
| 1. Establish tree nursery | * Meaning of tree nursery * Importance and purpose of tree nurseries * Certification of tree nursery * Tree species * Site selection * Preparation of potting media * Potting materials * Procedure of potting * Seed bed preparation * Types of seed beds * Seed sowing * Seed dormancy * Seed viability * Pricking out seedlings * Management of tree nursery   + Shading   + Watering   + Root pruning   + Weeding   + Hardening up   + Transplanting * Pest and disease management * Record keeping * Marketing | * Observation * Oral questioning * Written tests * Projects |
| 1. Improve tree productivity | * Meaning of tree productivity * Tree management aspects * Economics of agroforestry * Importance of tree productivity * Methods of improving tree productivity   + Grafting   + Budding   + Cloning   + Top working   + Pruning   + Layering   + Pollarding   + Coppicing | * Observation * Oral questioning * Written tests * Projects |

**Suggested Methods of instructions**

* Group discussions
* Lectures
* Demonstration by trainer
* Field trips
* Industrial attachment
* Projects
* Outreach programs
* Practicals
* Exercises by trainee

**Recommended Resources**

* Tree seeds
* Potting materials
* Nursery tools and equipment
* Agrochemicals
* Shade nets
* Greenhouses
* Water source
* Stationery
* Ladders
* Seed collection equipment

## SOIL AND WATER CONSERVATION

**UNIT CODE:** SL/CU/SM/CR/04/4/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Conserve soil and water

**Duration of Unit:**  80 hours

**Unit Description**

This unit describes the competencies required to conserve soil and water. It involves establishing cross slope barriers, reinforce embankments, harvesting water, controlling soil erosion and establishing soil cover and control water pollution

**Summary of Learning Outcomes**

* + - 1. Control soil erosion
      2. Establish cross slope barriers
      3. Reinforce embankments
      4. Establish soil cover
      5. Harvest water
      6. Control water pollution

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Methods of Assessment** |
| * + - 1. Control soil erosion | * Meaning of soil erosion * Purpose of controlling soil erosion * Types of soil erosion * Causes of soil erosion * Methods of controlling soil erosion | * Observation * Oral questioning * Written tests * Projects |
| * + - 1. Establish cross slope barriers | * Meaning of cross slope barriers * Purpose of cross slope barriers * Types of cross slope barriers * Laying of contours * Construction of cross slope barriers   + Terraces   + Trash lines   + Grass strips   + Stone lines   + Check dams   + Retention ditches   + Gabions   + Cut off drains * Maintenance of cross slope barriers | * Observation * Oral questioning * Written tests * Projects |
| * + - 1. Reinforce embankments | * Types of embankments * Purpose of reinforcing embankments * Methods of reinforcing embankments | * Observation * Oral questioning * Written tests * Projects |
| * + - 1. Establish soil cover | * Meaning of soil cover * Purpose of soil cover * Types of soil cover * Establishment of soil cover   + Mulch   + Cover crops * Maintenance of soil cover | * Observation * Oral questioning * Written tests * Projects |
| * + - 1. Harvest water | * Meaning of water harvesting * Purpose of water harvesting * Water harvesting techniques   + Roof catchments   + Rock catchments   + Mitre drains * Types of water harvesting structures   + Earth dams   + Sand dams   + Water pans   + Farm ponds   + Tanks   + Cisterns   + Zai pits   + Trapezoidal bunds   + Semi-circular bunds   + Retention ditches   + Boreholes   + Wells * Construction of water harvesting structures * Maintenance of water harvesting structures. | * Observation * Oral questioning * Written tests * Projects |
| * + - 1. Control water pollution | * Sources of soil pollution * Determination of soil pollution level * Treatment of polluted soil * Soil pollution control measures * Environmental regulations (EMCA) | * Observation * Oral questioning * Written tests * Projects |

**Suggested Methods of instruction**

* Group discussions
* Lectures
* Case studies
* Demonstration by trainer
* Field trips
* Industrial attachment
* Outreach programs
* Projects
* Practicals
* Exercises by trainee

**Recommended Resources**

* Farm tools
* Demo plots
* Protective gear
* Irrigation kits
* Water source
* Surveying tools and equipment
* Stationery
* Computers with internet connection