

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**FORESTER**

**LEVEL 6**



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 of 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 Technical and Vocational Education Training (TVET). 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 these National Occupational Standards was developed for the purpose of developing a competency-based curriculum for Forestry Level 6. These National Occupational Standards will also be the basis for assessment of an individual for competence certification.

It is my conviction that these National Occupational Standards will play a great role towards development of competent human resource for forestry sector’s growth and sustainable development.

**PRINCIPAL SECRETARY**

**VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

## PREFACE

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Forestry Sector Skills Advisory Committee (SSAC) have developed these National Occupational Standards for a Forestry level 6. These standards will be the bases for development of a competency-based curriculum for a Forestry Level 6. These Standards will also be the basis for assessment of an individual for competence certification.

The Occupational Standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.

I am grateful to the Council Members, Council Secretariat, Forestry SSAC, expert workers and all those who participated in the development of these Occupational Standards.

**CHAIRMAN**

**TVET CDACC**

## ACKNOWLEDGMENT

These National Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am sincerely thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to the Forestry Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

I acknowledge all other institutions which in one way or another contributed to the development of these Standards.

**CHAIRMAN**

**FORESTRY SECTOR SKILLS ADVISORY COMMITTEE**

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## ABBREVIATIONS AND ACRONYMS

BC Basic Competency

CDACC Curriculum Development Assessment and Certification Council.

CR Core Competency

EMCA Environmental Management and Co-ordination Act

FAO Food and Agriculture Organization.

FCMA Forestry Conservation and Management Act.

FSGOs Forestry Service Guidelines Orders.

ICT Information Communication Technology

ISTA International Seed Testing Association.

IUCN International Union for Conservation of Nature.

KEFRI Kenya Forestry Research Institute.

KFSC Kenya Forestry Seed Center.

MoE Ministry of Education

NEMA National Environment Management Authority

NTFPs Non-Timber Forestry Products.

NWFPs Non-Wood Forestry Products.

OS Occupational Standards

OSH Occupation Safety and Health

OSHA Occupation Safety and Health Act

OSHS Occupational Safety and Health Standards

PFM Participatory Forest Management.

PPE Personal Protective Equipment

SOPs Standard Operating Procedures.

SSAC Sector Skills Advisory Committee

TVET Technical and Vocational Education and Training

## KEY TO UNIT CODE

**FO /OS / EN /BC /01/ 6/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# OVERVIEW

Forester level 6 qualification consists of competencies that an individual must achieve to for forestry management. The qualification consists of competencies that an individual must achieve to propagate tree germplasm, manage tree nursery, implement forest silvicultural operations, manage forest ecosystems, conduct forest inventory and valuation, manage forest engineering operations, manage pests and diseases, manage forest harvesting and logging, undertake wood utilization and processing, conduct forest extension and agroforestry, enforce forest law and policy, conduct forest land survey and mapping and manage forest fires.

This course consists of the following basic, common and core units of competency:

**Basic Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| FO/OS/EN/BC/01/6/A | Demonstrate Communication Skills |
| FO/OS/EN/BC/02/6/A | Demonstrate Numeracy Skills |
| FO/OS/EN/BC/03/6/A | Demonstrate Digital Literacy |
| FO/OS/EN/BC/04/6/A | Demonstrate Entrepreneurial Skills |
| FO/OS/EN/BC/05/6/A | Demonstrate Employability Skills |
| FO/OS/EN/BC/06/6/A | Demonstrate Environmental Literacy |
| FO/OS/EN/BC/07/6/A | Demonstrate Occupational Safety and Health Practices |

**Common unit of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| MATH/OS/AS/CC/03/6/A | Apply Research Methods |

**Core Units of Competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| FO/OS/EN/CR/01/6/A | Propagate Tree Germplasm. |
| FO/OS/EN/CR/02/6/A | Manage Tree Nursery.  |
| FO/OS/EN/CR/03/6/A | Implement Forest Silvicultural Operations. |
| FO/OS/EN/CR/04/6/A | Manage Forest Ecosystems. |
| FO/OS/EN/CR/05/6/A | Conduct Forest Inventory And Valuation. |
| FO/OS/EN/CR/06/6/A | Manage Forest Engineering Operations. |
| FO/OS/EN/CR/07/6/A | Manage Forest Pests And Diseases. |
| FO/OS/EN/CR/08/6/A | Manage Forest Harvesting And Logging. |
| FO/OS/EN/CR/09/6/A | Undertake Wood Utilization And Processing. |
| FO/OS/EN/CR/10/6/A | Conduct Forest Extension. |
| FO/OS/EN/CR/11/6/A | Manage Agroforestry Systems. |
| FO/OS/EN/CR/12/6/A | Enforce Forest Law And Policy. |
| FO/OS/EN/CR/13/6/A | Conduct Forest Land Survey And Mapping. |
| FO/OS/EN/CR/14/6/A | Manage Forest Fires. |
|  | Industrial Attachment |

# BASIC UNITS OF COMPETENCY

## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** FO/OS/EN/BC/01/6/A

**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.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Meet communication needs of clients and colleagues
 | 1. Specific communication needs of clients and colleagues are identified and met based on workplace requirements
2. Different communication approaches are identified and applied according to clients’ needs
3. Conflict is identified and addressed as per the standards of the organization
 |
| 1. Develop communication strategies
 | * 1. Strategies for effective internal and external dissemination of information are developed as per organization’s requirements
	2. Special communication needs are considered in developing strategies according workplace procedures
	3. ***Communication strategies*** are analyzed, evaluated and revised based the workplace needs
 |
| 1. Establish and maintain communication pathways
 | * 1. Pathways of communication are established as per organization policy
	2. Pathways are maintained and reviewed according to organization procedures
 |
| 1. Promote use of communication strategies
 | * 1. Information is provided to all areas of the organization as per strategy requirements
	2. Effective communication techniques are articulated and modeled according work requirements
	3. Personnel are given guidance about adapting communication strategies as per organization procedures
 |
| 1. Conduct interview
 | 1. A range of appropriate communication strategies are employed in ***interview situations*** based on the workplace requirements
2. Records of interviews are made and maintained in accordance with organizational procedures
3. Effective questioning, listening and nonverbal communication techniques are used as per needs
 |
| 1. Facilitate group discussion
 | 1. Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements
2. Strategies to encourage group participation are identified and used as per organizations’ procedures
3. Meetings objectives and agenda are set and followed based on workplace requirements
4. Relevant information is provided and feedback obtained according to set protocols
5. Evaluation of group communication strategies is undertaken in accordance with workplace guidelines
6. Specific communication needs of individuals are identified and addressed as per individual needs
 |
| 1. Represent the organization
 | 1. 7Relevant presentation are researched and presented based on internal or external communication forums requirements
2. Presentation is delivered in a clear and sequential manner as per the predetermined time
3. Presentation is made as per appropriate media
4. Difference views are respected based on workplace procedures
5. Written communication is done as per organizational standards
6. Inquiries are responded according to organizational standard
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Communication strategies may include but not limited to:
 | * Language switch
* Comprehension check
* Repetition
* Asking confirmation
* Paraphrase
* Clarification request
* Translation
* Restructuring
* Approximation
* Generalization
 |
| 1. Effective group interaction may include but not limited to:
 | * Identifying and evaluating what is occurring within an interaction in a nonjudgmental way
* Using active listening
* Making decision about appropriate words, behavior
* Putting together response which is culturally appropriate
* Expressing an individual perspective
* Expressing own philosophy, ideology and background and exploring impact with relevance to communication
 |
| 1. Situations may include but not limited to:
 | * Establishing rapport
* Eliciting facts and information
* Facilitating resolution of issues
* Developing action plans
* Diffusing potentially difficult situations
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Active listening
* Interpretation
* Negotiation
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Communication process
* Dynamics of groups
* Styles of group leadership
* Key elements of communications strategy

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate: 1. Developed communication strategies to meet the organization requirements and applied in the workplace
2. Established and maintained communication pathways for effective communication in the workplace
3. Used communication strategies involving exchanges of complex oral information
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Access to relevant workplace or appropriately simulated environment where assessment can take place
2. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Direct observation
2. Oral questioning
3. Written texts
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE NUMERACY SKILLS

**UNIT CODE:** FO/OS/EN/BC/02/6/A

**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.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range.*** |
| 1. Apply a wide range of mathematical calculations for work
 | * 1. Mathematical information embedded in a range of workplace tasks and texts is extracted as per workplace procedures.
	2. Mathematical information is interpreted and comprehended as per job specifications
	3. A range of mathematical and problem solving processes are selected and used as per job specification
	4. Different forms of fractions, decimals and percentages are flexibly used as per SOPs
	5. Calculation performed with positive and negative numbers as per SOPs
	6. Numbers are expressed as powers and roots and are used in calculations as per SOPs
	7. Calculations done using routine formulas as per SOPs
	8. Estimation and assessment processes are used to check outcome as per workplace procedures
	9. Mathematical language is used to discuss and explain the processes, results and implications of the task as per workplace procedures
 |
| 1. Use and apply ratios, rates and proportions for work
 | * 1. Information regarding ratios, rates and proportions extracted from a range of workplace tasks and texts as per SOPs
	2. Mathematical information related to ratios, rate and proportions is analysed as per SOPs
	3. Problem solving processes are used to undertake the task as per workplace procedures
	4. Equivalent ratios and rates are simplified as per SOPs
	5. Quantities are calculated using ratios, rates and proportions as per SOPS
	6. Graphs, charts or tables are constructed to represent ratios, rates and proportions as per SOPs
	7. The outcomes reviewed and checked as per job specifications
	8. Information is record using mathematical language and symbols as per workplace procedures
 |
| 1. Estimate, measure and calculate measurement for work
 | * 1. Measurement information embedded in workplace texts and tasks are extracted and interpreted as per job specifications
	2. Appropriate workplace measuring equipment are identified and selected as per job specifications
	3. Accurate measurements are estimated and made as per SOPs
	4. The area of ***2D shapes*** including compound shapes are calculated as per SOPs
	5. The volume of 3D shapes is calculated using relevant formulas as per SOPs
	6. Sides of right angled triangles are calculated using Pythagoras’ theorem as per SOPs
	7. conversions are perform between units of measurement as per job specification
	8. Problem solving processes are used to undertake the task as per workplace Procedures
	9. The measurement outcomes are reviewed and checked as per workplace procedures
	10. Information is recorded using mathematical language and symbols appropriate for the task as per workplace procedures
 |
| 1. Use detailed maps to plan travel routes for work
 | * 1. Different types of maps are identified and interpreted as per job requirements
	2. Key features of maps are identified as per job requirements
	3. Scales are identified and interpreted as per job requirements
	4. Scales are applied to calculate actual distances
	5. Positions or locations are determined using directional information as per job requirements
	6. Routes are planned by determining directions and calculating distances, speeds and times as per job requirements
	7. Information is gathered and identified and relevant factors related to planning a route checked as per job requirements
	8. Relevant equipment is select and checked for accuracy and operational effectiveness as per job requirements
	9. Task is planned and recorded using specialized mathematical language and symbols appropriate for the task as per job requirements
 |
| 1. Use geometry to draw 2D shapes and construct 3D shapes for work
 | * 1. A range of 2D shapes and 3D shapes and their uses in work contexts is identified as per job specifications
	2. Features of 2D and 3D shapes are named and described as per job specifications
	3. Types of angles in 2D and 3D shapes are identified as per job specifications
	4. Angles are drawn, estimated and measured using geometric instruments as per job requirements
	5. Angle properties of 2D shapes are named and identified as per SOPs
	6. Angle properties are used to evaluate unknown angles in shapes as per SOPs
	7. Properties of perpendicular and parallel lines are applied to shapes as per SOPs
	8. Understanding and use of symmetry is demonstrated as per SOPs
	9. Understanding and use of similarity is demonstrated as per SOPs
	10. The workplace tasks and mathematical processes required are identified as per workplace procedures
	11. 2D shapes is drawn for work as per job specification
	12. 3D shapes is constructed for work as per job specification
	13. The outcomes are reviewed and checked as per workplace procedures
	14. Specialized mathematical language and symbols appropriate for the task are used as per SOPs
 |
| 1. Collect, organize, and interpret statistical data for work
 | * 1. Workplace issue requiring investigation are identified as per workplace procedures
	2. Audience / population / sample unit is determined as per workplace procedures as per workplace procedures
	3. Data to be collected is identified as per workplace procedures
	4. Data collection method is selected as per workplace procedures
	5. Appropriate statistical data is collected and organized as per SOPs
	6. Data is illustrated in appropriate formats as per SOPs
	7. The effectiveness of different types of graphs are compared as per SOPs
	8. The summary statistics for collected data is calculated as per SOPs
	9. The results / findings are interpreted as per SOPs
	10. Data is checked to ensure that it meets the expected results and content as per workplace procedures
	11. Information from the results including tables, graphs and summary statistics is extracted and interpreted as per workplace procedure
	12. Mathematical language and symbols are used to report results of investigation as per workplace procedure
 |
| 1. Use routine formula and algebraic expressions for work
 | * 1. Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated as per SOPs
	2. Simple algebraic expressions and equations are developed as per job specification
	3. Operate on algebraic expressions as per job requirement
	4. Algebraic expressions are simplified as per job requirement
	5. Substitution into simple routine equations is done as per SOPs
	6. Routine formulas used for work tasks are identified and comprehended as per SOPs
	7. Routine formulas are evaluate by substitution as per SOPs
	8. Routine formulas transposed as per SOPs
	9. Appropriate formulas are identified and used for work related tasks as per workplace procedures
	10. Outcomes are checked and result of calculation used as per workplace procedures
 |
| 1. Use common functions of a scientific calculator for work
 | * 1. Required numerical information to perform tasks is located as per job specification
	2. The order of operations and function keys necessary to solve mathematical calculation are determined as per job specification
	3. Function keys on a scientific calculator are identified and used as per SOPs
	4. Estimations are referred to check reasonableness of problem solving process as per workplace procedures
	5. Appropriate mathematical language, symbols and conventions are used to report results as per workplace procedures
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. 2D shapes may include but not limited to:
 | * Triangles
* Square
* Rectangle
* Triangle
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Measuring
* Logical thinking
* Computing
* Drawing of graphs
* Applying mathematical formulas
* Analytical

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Types of common shapes
* Differentiation between two dimensional shapes / objects
* Formulae for calculating area and volume
* Types and purpose of measuring instruments
* Units of measurement and abbreviations
* Fundamental operations (addition, subtraction, division, multiplication)
* Rounding techniques
* Types of fractions
* Different types of tables and graphs
* Meaning of graphs, such as increasing, decreasing, and constant value
* Preparation of basic data, tables & graphs

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:1. Developed communication strategies to meet the organization requirements and applied in the workplace
2. Established and maintained communication pathways for effective communication in the workplace
3. Used communication strategies involving exchanges of complex oral information
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace or appropriately simulated environment where assessment can take place
2. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE DIGITAL LITERACY

**UNIT CODE:** FO/OS/EN/BC/03/6/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Identify appropriate computer software and hardware
 | * 1. Concepts of ICT are determined in accordance with computer equipment
	2. Classifications of computers are determined in accordance with manufacturers specification
	3. Appropriate computer software is identified according to manufacturer’s specification
	4. Appropriate computer hardware is identified according to manufacturer’s specification
	5. Functions and commands of operating system are determined in accordance with manufacturer’s specification
 |
| 1. Apply security measures to data, hardware, software in automated environment
 | * 1. ***Data security and privacy are classified*** in accordance with the prevailing technology
	2. ***Security threats*** reidentified ***and control measures*** are applied in accordance with laws governing protection of ICT
	3. Computer threats and crimes are detected in accordance to Information Management security guidelines
	4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
 |
| 1. Apply computer software in solving tasks
 | * 1. ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation as per the job requirements
	2. ***Word processing utilities*** are applied in accordance with workplace procedures
	3. Worksheet layout is prepared in accordance with work procedures
	4. Worksheet is built and data manipulated in the worksheet in accordance with workplace procedures
	5. Continuous data manipulated on worksheet is undertaken in accordance with work requirements
	6. Database design and manipulation is undertaken in accordance with office procedures
	7. Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
 |
| 1. Apply internet and email in communication at workplace
 | * 1. Electronic mail addresses are opened and applied in workplace communication in accordance with office policy
	2. Office internet functions are defined and executed in accordance with office procedures
	3. ***Network configuration*** is determined in accordance with office operations procedures
	4. Official World Wide Web is installed and managed according to workplace procedures
 |
| 1. Apply Desktop publishing in official assignments
 | * 1. Desktop publishing functions and tools are identified in accordance with manufactures specifications
	2. Desktop publishing tools are developed in accordance with work requirements
	3. Desktop publishing tools are applied in accordance with workplace requirements
	4. Typeset work is enhanced in accordance with workplace standards
 |
| 1. Prepare presentation packages
 | * 1. Types of presentation packages are identified in accordance with office requirements
	2. Slides are created and formulated in accordance with workplace procedures
	3. Slides are edited and run-in accordance with work procedures
	4. Slides and handouts are printed according to work requirements
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Appropriate computer hardware may include but not limited to:
 | Collection of physical parts of a computer system such as:* Computer case, monitor, keyboard, and mouse
* All the parts inside the computer case, such as the hard disk drive, motherboard and video card
 |
| 1. Data security and privacy may include but not limited to:
 | * Confidentiality of data
* Cloud computing
* Integrity -but-curious data surfing
 |
| 1. Security and control measures may include but not limited to:
 | * Counter measures against cyber terrorism
* Risk reduction
* Cyber threat issues
* Risk management
* Pass-wording
 |
| 1. Security threats may include but not limited to:
 | * Cyber terrorism
* Hacking
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical skills
* Interpretation
* Typing
* Communication
* Computing (applying fundamental operations such as addition, subtraction, division and multiplication)
* Using calculator
* Basic ICT skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Software concept
* Functions of computer software and hardware
* Data security and privacy
* Computer security threats and control measures
* Technology underlying cyber-attacks and networks
* Cyber terrorism
* Computer crimes
* Detection and protection of computer crimes
* Laws governing protection of ICT
* Word processing;
* Functions and concepts of word processing.
* Documents and tables creation and manipulations
* Mail merging
* Word processing utilities
* Spread sheets;
* Meaning, formulae, function and charts, uses and layout
* Data formulation, manipulation and application to cells
* Database;
* Database design, data manipulation, sorting, indexing, storage retrieval and security
* Desktop publishing;
* Designing and developing desktop publishing tools
* Manipulation of desktop publishing tools
* Enhancement of typeset work and printing documents
* Presentation Packages;
* Types of presentation Packages
* Creating, formulating, running, editing, printing and presenting slides and handouts
* Networking and Internet;
* Computer networking and internet.
* Electronic mail and world wide web
* Emerging trends and issues in ICT;
* Identify and integrate emerging trends and issues in ICT
* Challenges posed by emerging trends and issues

**EVIDENCE** **GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Identified and controlled security threats
	2. Detected and protected computer crimes
	3. Applied word processing in office tasks
	4. Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures
	5. Opened electronic mail for office communication as per workplace procedure
	6. Installed internet and World Wide Web for office tasks in accordance with office procedures
	7. Integrated emerging issues in computer ICT applications
	8. Applied laws governing protection of ICT
 |
| 1. Resource Implications
 |  The following resources should be provided:* 1. Access to relevant workplace where assessment can take place
	2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written test
	4. Portfolio of Evidence
	5. Interview
	6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE ENTREPRENEURIAL SKILLS

**UNIT CODE :** FO/OS/EN/BC/04/6/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** | **PERFORMANCE CRITERIA**  |
| 1. Demonstrate understanding of an Entrepreneur
 | 1. Entrepreneurs and Business persons are distinguished as per principles of entrepreneurship
2. ***Types of entrepreneurs*** are identified as per principles of entrepreneurship
3. Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship
4. ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship
5. Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship
 |
| 1. Demonstrate understanding of Entrepreneurship and self-employment
 | 1. Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship
2. Importance of self-employment is analysed based on business procedures and strategies
3. ***Requirements for entry into self-employment*** are identified according to business procedures and strategies
4. Role of an Entrepreneur in business is determined according to business procedures and strategies
5. Contributions of Entrepreneurs to National development are identified as per business procedures and strategies
6. Entrepreneurship culture in Kenya is explored as per business procedures and strategies
7. Born or made Entrepreneurs are distinguished as per entrepreneurial traits
 |
| 1. Identify Entrepreneurship opportunities
 | 1. Sources of business ideas are identified as per business procedures and strategies
2. Business ideas and opportunities are generated as per business procedures and strategies
3. Business life cycle is analysed as per business procedures and strategies
4. Legal aspects of business are identified as per procedures and strategies
5. Product demand is assessed as per market strategies
6. Types of ***business environment*** are identified and evaluated as per business procedures
7. Factors to consider when evaluating business environment are explored based on business procedure and strategies
8. Technology in business is incorporated as per best practice
 |
| 1. Create entrepreneurial awareness
 | 1. ***Forms of businesses*** are explored as per business procedures and strategies
2. Sources of business finance are identified as per business procedures and strategies
3. Factors in selecting source of business finance are identified as per business procedures and strategies
4. ***Governing policies*** on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies
5. Problems of starting and operating SSEs are explored as per business procedures and strategies
 |
| 1. Apply entrepreneurial motivation
 | 1. ***Internal and external motivation*** factors are determined in accordance with motivational theories
2. Self-assessment is carried out as per entrepreneurial orientation
3. Effective communications are carried out in accordance with communication principles
4. Entrepreneurial motivation is applied as per motivational theories
 |
| 1. Develop innovative business strategies
 | 1. Business innovation strategies are determined in accordance with the organization strategies
2. Creativity in business development is demonstrated in accordance with business strategies
3. ***Innovative business strategies*** are developed as per business principles
4. Linkages with other entrepreneurs are created as per best practice
5. ICT is incorporated in business growth and development as per best practice
 |
| 1. Develop Business Plan
 | 1. Identified Business is described as per business procedures and strategies
2. Marketing plan is developed as per business plan format
3. Organizational/Management plan is prepared in accordance with business plan format
4. Production/operation plan in accordance with business plan format
5. Financial plan is prepared in accordance with the business plan format
6. Executive summary is prepared in accordance with business plan format
7. Business plan is presented as per best practice
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range**  |
| 1. Types of entrepreneurs may include but not limited to:
 | * Innovators
* Imitators
* Craft
* Opportunistic
* Speculators
 |
| 1. Characteristics of Entrepreneurs may include but not limited to:
 | * Creative
* Innovative
* Planner
* Risk taker
* Networker
* Confident
* Flexible
* Persistent
* Patient
* Independent
* Future oriented
* Goal oriented
 |
| 1. Requirements for entry into self-employment may include but not limited to
 | * Technical skills
* Management skills
* Entrepreneurial skills
* Resources
* Infrastructure
 |
| 1. Internal and external motivation may include but not limited to:
 | * Interest
* Passion
* Freedom
* Prestige
* Rewards
* Punishment
* Enabling environment
* Government policies
 |
| 1. Business environment may include but not limited to:
 | * External
* Internal
* Intermediate
 |
| 1. Forms of businesses may include but not limited to:
 | * Sole proprietorship
* Partnership
* Limited companies
* Cooperatives
 |
| 1. Governing policies may include but not limited to:
 | * Increasing scope for finance
* Promoting cooperation between entrepreneurs and private sector
* Reducing regulatory burden on entrepreneurs
* Developing IT tools for entrepreneurs
 |
| 1. Innovative business strategies may include but not limited to:
 | * New products
* New methods of production
* New markets
* New sources of supplies
* Change in industrialization
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical
* Management
* Problem-solving
* Root-cause analysis
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Decision making
* Business communication
* Change management
* Competition
* Risk
* Net working
* Time management
* Leadership
* Factors affecting entrepreneurship development
* Principles of Entrepreneurship
* Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,
* Conflict resolution
* Health, safety and environment (HSE) principles and requirements
* Customer care strategies
* Basic financial management
* Business strategic planning
* Impact of change on individuals, groups and industries
* Government and regulatory processes
* Local and international market trends
* Product promotion strategies
* Market and feasibility studies
* Government and regulatory processes
* Local and international business environment
* Relevant developments in other industries
* Regional/ County business expansion strategies

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | 1. Assessment requires evidence that the candidate:
2. Distinguished entrepreneurs and businesspersons correctly
3. Identified ways of becoming an entrepreneur appropriately
4. Explored factors affecting entrepreneurship development appropriately
5. Analysed importance of self-employment accurately
6. Identified requirements for entry into self-employment correctly
7. Identified sources of business ideas correctly
8. GeneratedBusiness ideas and opportunities correctly
9. Analysed business life cycle accurately
10. Identified legal aspects of business correctly
11. Assessed product demand accurately
12. Determined Internal and external motivation factors appropriately
13. Carried out communications effectively
14. Identified sources of business finance correctly
15. Determined Governing policy on small scale enterprise appropriately
16. Explored problems of starting and operating SSEs effectively
17. Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly
18. Prepared executive summary correctly
19. Determined business innovative strategies appropriately
20. Presented business plan effectively
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | 1. Written tests
2. Oral questions
3. Third party report
4. Interviews
5. Portfolio of Evidence
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** FO/OS/EN/BC/05/6/A

**UNIT DESCRIPTON**

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.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Conduct self-management
 | 1. Personal vision, mission and goals are formulated based on potential and in relation to organization objectives
2. Emotional intelligence is demonstrated as per workplace requirements.
3. Individual performance is evaluated and monitored according to the agreed targets.
4. Assertiveness is developed and maintained based on the requirements of the job.
5. Accountability and responsibility for own actions are demonstrated based on workplace instructions.
6. Self-esteem and a positive self-image are developed and maintained based on values.
7. Time management, attendance and punctuality are observed as per the organization policy.
8. Goals are managed as per the organization’s objective
9. Self-strengths and weaknesses are identified based on personal objectives
 |
| 1. Demonstrate interpersonal communication
 | 1. Writing skills are demonstrated as per communication policy
2. Negotiation and persuasion skills are demonstrated as per communication policy
3. Internal and external stakeholders’ needs are identified and interpreted as per the communication policy
4. Communication networks are established based on workplace policy
5. Information is shared as per communication policy
 |
| 1. Demonstrate critical safe work habits
 | * 1. Stress is managed in accordance with workplace policy.
	2. Punctuality and time consciousness is demonstrated in line with workplace policy.
	3. Personal objectives are integrated with organization goals based on organization’s strategic plan.
	4. ***Resources*** are utilized in accordance with workplace policy.
	5. Work priorities are set in accordance to workplace goals and objectives.
	6. Leisure time is recognized and utilized in line with personal objectives.
	7. ***Drugs and substances of abuse*** are identified and avoided based on workplace policy.
	8. HIV and AIDS prevention awareness is demonstrated in line with workplace policy.
	9. Safety consciousness is demonstrated in the workplace based on organization safety policy.
	10. ***Emerging issues*** are identified and dealt with in accordance with organization policy.
 |
| 1. Lead a workplace team
 | 1. Performance targets for the ***team*** are set based on organization’s objectives
2. Duties are assigned in accordance with the organization policy.
3. ***Forms of communication*** in a team are established according to organization’s policy.
4. Team performance is evaluated based on set targets as per workplace policy.
5. Conflicts are resolved between team members in line with organization policy.
6. Gender related issues are identified and mainstreamed in accordance workplace policy.
7. Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010.
8. Healthy relationships are developed and maintained in line with workplace.
 |
| 1. Plan and organize work
 | 1. Work plans are prepared based on activities and budget.
2. Assigned tasks are interpreted and expectations identified as per the workplace instructions.
3. Task occupational safety and health requirements are identified and observed regulations.
4. Work resources are identified, mobilized, allocated and utilized based on organization work plans.
5. Work activities are monitored and evaluated in line with work plans and workplace policy.
6. Work plans are reviewed based on target and available resources.
 |
| 1. Maintain professional growth and development
 | * 1. Personal training needs are identified and assessed in line with the requirements of the job.
	2. ***Training and career opportunities*** are identified and utilized based on job requirements.
	3. Resources for training are mobilized and allocated based organizations and individual skills needs.
	4. Licensees and certifications relevant to job and career are obtained and renewed as per policy.
	5. Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives.
	6. Recognitions are sought as proof of career advancement in line with professional requirements.
 |
| 1. Demonstrate workplace learning
 | * 1. Learning opportunities are sought and managed based on job requirement and organization policy.
	2. Improvement in performance is demonstrated based on courses attended.
	3. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job
	4. Time and effort is invested in learning new skills based on job requirements
	5. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.
	6. New systems are developed and maintained in accordance with the requirements of the job.
	7. Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job.
 |
| 1. Demonstrate problem solving skills
 | * 1. Creative, innovative and practical solutions are developed based on the problem
	2. Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job.
	3. Team problems are solved as per the workplace guidelines
	4. Problem solving strategies are applied as per the workplace guidelines
	5. Problems are analyzed and assumptions tested as per the context of data and circumstances
 |
| 1. Manage ethical performance
 | * 1. Policies and guidelines are observed as per the workplace requirements
	2. Self-worth and professionalism is exercised in line with personal goals and organizational policies
	3. Code of conduct is observed as per the workplace requirements
	4. Integrity is demonstrated as per legal requirement
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Drug and substance abuse may include but not limited to:
 | Commonly abused* Alcohol
* Tobacco
* Miraa
* Over-the-counter drugs
* Cocaine
* Bhang
* Glue
 |
| 1. Feedback may include but not limited to:
 | * Verbal
* Written
* Informal
* Formal
 |
| 1. Relationships may include but not limited to:
 | * Man/Woman
* Trainer/trainee
* Employee/employer
* Client/service provider
* Husband/wife
* Boy/girl
* Parent/child
* Sibling relationships
 |
| 1. Forms of communication may include but not limited to:
 | * Written
* Visual
* Verbal
* Non verbal
* Formal and informal
 |
| 1. Team may include but not limited to:
 | * Small work group
* Staff in a section/department
* Inter-agency group
 |
| 1. Personal growth may include but not limited to:
 | * Growth in the job
* Career mobility
* Gains and exposure the job gives
* Net workings
* Benefits that accrue to the individual as a result of noteworthy performance
 |
| 1. Personal objectives may include but not limited to:
 | * Long term
* Short term
* Broad
* Specific
 |
| 1. Trainings and career opportunities may includes but not limited to
 | * Participation in training programs
* Serving as Resource Persons in conferences and workshops
 |
| 1. Resource may include may but not limited to:
 | * Human
* Financial
* Technology
 |
| 1. Innovation may include but not limited to:
 | * New ideas
* Original ideas
* Different ideas
* Methods/procedures
* Processes
* New tools
 |
| 1. Emerging issues may include but not limited to:
 | * Terrorism
* Social media
* National cohesion
* Open offices
 |
| 1. Range of media for learning may include but not limited to:
 | * Mentoring
* peer support and networking
* IT and courses
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Interpersonal
* Communication
* Critical thinking
* Organizational
* Negotiation
* Monitoring
* Evaluation
* Record keeping
* Problem solving
* Decision Making
* Resource utilization
* Resource mobilization

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Work values and ethics
* Company policies
* Company operations, procedures and standards
* Occupational Health and safety procedures
* Fundamental rights at work
* Workplace communication
* Concept of time
* Time management
* Decision making
* Types of resources
* Work planning
* Organizing work
* Monitoring and evaluation
* Record keeping
* Gender mainstreaming
* HIV and AIDS
* Drug and substance abuse
* Professional growth and development
* Technology in the workplace
* Innovation
* Emerging issues

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Conducted self-management
	2. Demonstrated interpersonal communication
	3. Demonstrated critical safe work habits
	4. Demonstrated the ability to lead a workplace team
	5. Planned and organized work
	6. Maintained professional growth and development
	7. Demonstrated workplace learning
	8. Demonstrated problem solving skills
	9. Demonstrated the ability to manage performance ethically
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** FO/OS/EN/BC/06/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate environmental literacy. It involves, controlling environmental hazard and environmental pollution, demonstrating 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 , analyzing resource use and developing resource conservation plans

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Control environmental hazard
 | 1. Storage methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS.
2. Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS.
3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental Pollution
 | * 1. Environmental pollution ***control measures*** are implemented in accordance with international protocols.
	2. Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999
	3. Methods for minimizing noise pollution is complied with based on Noise and Excessive Vibration Pollution and Control Regulations, 2009
 |
| 1. Demonstrate sustainable resource use
 | * 1. Methods for minimizing wastage are complied with based on organizational waste management guide
	2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)
	3. Methods for economizing and reducing resource consumption are practiced as per the Constitution of Kenya 2010 Article 69 .
 |
| 1. Evaluate current practices in relation to resource usage
 | * 1. Information on resource efficiency systems and procedures are collected and provided as per work groups/sector
	2. Current resource usage is measured and recorded as per work group
	3. Current purchasing strategies are analyzed and recorded according to industry procedures.
	4. Current work processes to access information and data is analyzed following enterprise protocol.
 |
| 1. Identify environmental legislations/conventions for environmental concerns
 | 1. Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact
2. Industrial standard/environmental practices are described according to the different environmental concerns
 |
| 1. Implement specific environmental programs
 | 1. Programs/Activities are identified according to organizations policies and guidelines.
2. Individual roles/responsibilities are determined and performed based on the activities identified.
3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines
4. Stakeholders are consulted based on company guidelines
 |
| 1. Monitor activities on Environmental protection/Programs
 | 1. Activities are periodically monitored and Evaluated according to the objectives of the environmental program
2. Feedback from stakeholders are gathered and considered in Proposing enhancements to the program based on consultations
3. Data gathered are analyzed based on Evaluation requirements
4. Recommendations are submitted based on the findings
5. Management support systems are set/established to sustain and enhance the program
6. Environmental incidents are monitored and reported to
7. concerned/proper authorities
 |
| 1. Analyze resource use
 | 1. All resource consuming processes are Identified as per the organizational work plan
2. Quantity and nature of resource consumed is determined based on processes
3. Resource flow is analyzed as per different parts of the process.
4. Wastes are classified according to NEMA regulations on waste management.
 |
| 1. Develop resource Conservation plans
 | 9.1. Efficiency of use/conversion of resources is determined according to industry protocol.9.2. Causes of low efficiency of use of resources are Determined based on industry protocol.9.3. Plans for increasing the efficiency of resource use are developed based on findings. |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. PPE may include but not limited to
 | * + Mask
	+ Gloves
	+ Goggles
	+ Safety hat
	+ Overall
* Hearing protector
 |
| 1. Control measures may include but not limited to
 | * Methods for minimizing or stopping spread and ingestion of airborne particles
* Methods for minimizing or stopping spread and ingestion of gases and fumes
* Methods for minimizing or stopping spread and ingestion of liquid wastes
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Measuring
* Recording
* Analytical
* Monitoring
* Communication
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* PPEs
* Environmental regulations
* OSHS
* Pollution
* Waste management
* Principle of 3Rs
* Types of resources
* Techniques in measuring current usage of resources
* Environmental hazards
* Regulatory requirements

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Controlled environmental hazard
	2. Controlled environmental pollution
	3. Demonstrated sustainable resource use
	4. Evaluated current practices in relation to resource usage
	5. Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns.
	6. Described industrial standard environmental practices according to the different environmental issues/concerns.
	7. Resolved problems/ constraints encountered based on management standard procedures
	8. Implemented and monitored environmental practices on a periodic basis as per company guidelines
	9. Recommended solutions for the improvement of the program
	10. Monitored and reported to proper authorities any environmental incidents
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Workplace with storage facilities
	2. Tools, materials and equipment relevant to the tasks (e.g. Cleaning tools, cleaning materials, trash bags)
	3. PPE, manuals and references
	4. Legislation, policies, procedures, protocols and local ordinances relating to environmental protection
	5. Case studies/scenarios relating to environmental Protection
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written test
	4. Portfolio of Evidence
	5. Interview
	6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** FO/OS/EN/BC/07/6/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Identify workplace hazards and risk
 | 1.1 ***Hazards*** in the workplace are identified ***based their indicators*** 1.2 Risks and hazards are evaluated based on legal requirements.1.3 ***OSH concerns*** raised by workers are addressed as per legal requirements.  |
| 1. Control OSH hazards
 | 2.1 Hazard prevention ***and control measures*** are implemented as per legal requirement.2.2 Risk assessment is conductedand a risk matrix developed based on likely impact.2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures. |
| 1. Implement OSH programs
 | 3.1 Company OSH program are identified, evaluated and reviewed based on legal requirements.3.2 Company OSH programs are implemented as per legal requirements.3.3 Workers are capacity built on OSH standards and procedures as per legal requirements3.4 ***OSH-related records*** are maintained as per legal requirements. |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Hazards may include but not limited to:
 | * Physical hazards – impact, illumination, pressure, noise,
* vibration, extreme temperature, radiation
* Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects
* Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors
* Ergonomics
* Psychological factors – over exertion/ excessive force,

awkward/static positions, fatigue, direct pressure,* varying metabolic cycles
* Physiological factors – monotony, personal relationship, work out cycle
* Safety hazards (unsafe workplace condition) –confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris
* Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work)
 |
| 1. Indicators may include but not limited to:
 | * Increased of incidents of accidents, injuries
* Increased occurrence of sickness or health complaints/ symptoms
* Common complaints of workers related to OSH
* High absenteeism for work-related reasons
 |
| 1. OSH concerns may include but not limited to:
 | * Workers’ experience/observance on presence of work hazards
* Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)
* Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines
 |
| 1. Safety gears /PPE (Personal Protective Equipment) may include but not limited to:
 | * 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
 |
| 1. Appropriate risk controls

may include but not limited to: | * Appropriate risk controls in order of impact are as follows:
* Eliminate the hazard altogether (i.e., get rid of the dangerous machine)
* Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off)
* Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)
* Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage)
* Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users)
* Use personal protective equipment (i.e., wear
* gloves and goggles when using the machine)
 |
| 1. Contingency measures may include but not limited to:
 | * Evacuation
* Isolation
* Decontamination
* (Calling designed) emergency personnel
 |
| 1. Incidents and emergencies may include but not limited to:
 | * Chemical spills
* Equipment/vehicle accidents
* Explosion
* Fire
* Gas leak
* Injury to personnel
* Structural collapse
* Toxic and/or flammable vapors emission.
 |
| 1. OSH-related Records may include but not limited to:
 | * Medical/Health records
* Incident/accident reports
* Sickness notifications/sick leave application
* OSH-related trainings obtained
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Interpersonal
* Presentation
* Risk assessment
* Evaluation
* Critical thinking
* Problem solving
* Negotiation

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* General OSH Principles
* Occupational hazards/risks recognition
* OSH organizations providing services on OSH evaluation and/or work environment measurements (WEM)
* National OSH regulations; company OSH policies and protocols
* Systematic gathering of OSH issues and concerns
* General OSH principles
* National OSH regulations
* Company OSH and recording protocols, procedures and policies/guidelines
* Training and/or counseling methodologies and strategies

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Identified hazards in the workplace based their indicators
2. Evaluated workplace hazards based on legal requirements.
3. Addressed OSH concerns raised by workers as per legal requirements.
4. Implemented hazard prevention and control measures as per legal requirement.
5. Conducted risk assessment as per legal requirement.
6. Developed risk matrix based on likely impact.
7. Recognized and established contingency measures in accordance with organization procedures.
8. Identified, evaluated and reviewed company OSH program based on legal requirements.
9. Implemented company OSH programs as per legal requirements.
10. Capacity built workers on OSH standards and procedures as per legal requirements
11. Maintained OSH-related records as per legal requirements.
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

#

# COMMON UNIT OF COMPETENCY

## APPLY RESEARCH METHODS

**UNIT CODE:** MATH/OS/AS/CC/03/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required to carry out statistical data management. It involves formulating the research problem, carry out literature review, develop research objectives, develop research design and sample design, develop research budget proposal & time plan, collect research data, analyse collected research data, interpret findings and present findings

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Formulate the Research Problem
 | * 1. The proposal title is stated as per the problem and general objectives/research questions/hypotheses.
	2. The background of the study is outlined as per the study problem.
	3. The problem statement is formulated as per the research proposal
	4. Hypotheses are stated as per the research objectives.
	5. The importance/significance of the study is stated as per the problem statement.
 |
| 1. Carry out extensive literature review
 | * 1. Literature is reviewed as per the problem statement
	2. Information sources including citations and authors relevant to the research is assessed and captured as per the literature review.
	3. Referencing is done as per the citations
	4. Theoretical and conceptual framework are captured as per the problem statement
 |
| 1. Develop research objectives
 | * 1. Research objectives are developed as per the research problem
	2. Research objectives are stated as per the research problem
	3. Research hypotheses are formulated as per the objective
 |
| 1. Develop Research Design and Sampling Design
 | * 1. Research design is determined as per the problem statement.
	2. The ***scientific methodology*** is captured as per the problem statement.
	3. The sample size is determined as per the procedure
 |
| 1. Develop research budget proposal & work plan.
 | * 1. Direct costs are determined and estimated as per the research design
	2. Indirect costs are determined and estimated as per the research design.
	3. The budget narratives are captured as per the cost estimates.
	4. Total estimates are made and captured as per the costs.
	5. Time plan is developed as per stipulated time
 |
| 1. Collect research data.
 | * 1. Use of proposed research design is demonstrated as per the research proposal.
	2. Knowledge of data ethics and confidentiality is demonstrated as per the procedure.
	3. Questionnaires are Digitized as per the procedure
	4. Knowledge of law and human rights as well as religious and cultural believes is demonstrated as per the research.
	5. Data collection is done as per the set research design.
	6. Representative samples are selected as per the research design
 |
| 1. Analyse collected research data.
 | * 1. Data processing techniques are applied as per the procedures
	2. Descriptive tools and techniques are applied as per the procedures
	3. Inferential data analysis tools are applied as per the research design
 |
| 1. Interpretation research findings.
 | * 1. Descriptive outputs are interpreted as per the summaries
	2. ***Parameter estimates*** are interpreted as per the statistical model output
	3. Predictions are made as per the model estimates
	4. Hypothesis are tested and decisions made as per the problem
 |
| 1. Present research findings
 | * 1. Report is prepared for presentation to stakeholders and interested parties as per results
	2. The findings are presented as per the workplace procedure
 |

**RANGE**

This section provides work environment and conditions to which the performance

Criteria apply. It allows for different work environment and situations that will affect

Performance.

| **Variable** | **Range** |
| --- | --- |
| 1. Scientific methodology may include but not limited to:
 | * Methods of data collection and analysis
 |
| 1. Parameter estimates may include but not limited to:
 | * Slope
* constants
 |

**REQUIRED KNOWLEDGE AND UNDERSTANDING**

**Required Knowledge**

The individual needs to demonstrate knowledge and understanding of:

* Sources of research problems
* Steps in formulation of a research problem
* Reviewing the literature
* Formulation of objectives
* Research design
* Sample design
* Research instruments
* Piloting the questionnaire
* Collecting data
* Processing and analyzing data
* Reporting the findings

**EVIDENCE GUIDE**

This provides advice on assessment and must be in conjunction with the performance criteria, required knowledge and understanding and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Demonstrate knowledge of source of research problems
	2. Demonstrate knowledge to formulation of a research a problem
	3. Demonstrate knowledge research objectives
	4. Demonstrate knowledge of research hypothesis
	5. Demonstrate knowledge of reviewing of literature
	6. Demonstrate knowledge of citations and referencing
	7. Demonstrate formulation of research objectives
	8. Demonstrate knowledge of research designs
	9. Demonstrate knowledge of research instruments
	10. Demonstrate knowledge of piloting of research instrument
	11. Demonstrate knowledge of data collection
 |
| 1. Resource Implications
 | The following resources must be provided***:***1. Computer
2. Internet
3. Datasets
4. Books in statistics
5. Library books
 |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# CORE UNITS OF COMPETENCY

## PROPAGATE TREE GERMPLASM

**UNIT CODE:** FO/OS/EN/CR/01/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in handling and propagating tree germplasm. Competencies include identifying tree species, requisitioning tree seeds, tree seed surveying, collecting tree seeds, processing tree seeds, storing tree seeds and propagating plant material.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***(Bold and italicised terms are elaborated in the Range)*** |
| 1. Identify tree species.
 | * 1. Identified tree species suitable for the different purposes based on taxonomic keys.
	2. Evaluated tree species common in the region as per workplace procedures.
	3. Collected data on common tree species as per workplace procedures.
	4. Compiled common tree species into a database based on tree taxonomy and nomenclature.
 |
| 1. Tree seed survey.
 | * 1. Identified seed sources are inspected on status in readiness for seed collection as per KFSC procedures.
	2. Collected the seed samples for testing as per ISTA rules.
	3. Carried out ***cutting*** ***tests*** on sample of seeds for maturity as per KFSC procedures.
	4. Prepared seed collection plan based on cutting tests results.
 |
| 1. Collect tree seeds.
 | * 1. Assembled ***seed collection equipment*** as per KFSC workplace policies.
	2. Obtained permits for seed collection from seed source owners as per KFSC practice.
	3. Implemented seed collection plan as per KFSC guidelines.
	4. Delivered seeds to seed center as per KFSC guidelines.
 |
| 1. Process and store tree seeds.
 | * 1. Extracted seeds as per tree species requirements and tree seed handbook.
	2. Dried extracted seeds to the required moisture content as per tree seed handbook.
	3. Cleaned tree seeds and remove impurities as per tree seed handbook.
	4. Performed ***quality tests*** on tree seeds as per tree seed handbook.
	5. Labelled tree seeds as per the tree seed handbook.
	6. Classified and stored seeds as per the tree seed handbook.
 |
| 1. Requisition tree seeds.
 | * 1. Acquired and filled seed indent form as per seed requisition requirements.
	2. Indent form sent to KFSC or its regional branches as per seed requisition requirements.
	3. Indent invoiced and processed according to KFSC procedures.
	4. Seeds are paid for according to the invoice.
	5. Seeds are supplied as per the indent.
 |
| 1. Propagate plant material.
 | * 1. Identified high quality plant material for propagation as per workplace guidelines.
	2. Identified sources of collection of propagation material as per workplace guidelines.
	3. Prepared collection plan of the propagation material as per workplace procedures.
	4. Collected propagation material as per workplace procedures.
	5. Applied appropriate propagation method(s) as per clonal propagation handbook.
 |

**RANGE**

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Cutting tests may include but not limited to:
 | * Seed maturity.
* Seed morphology.
* Seed colour change.
* Seed disease infection/infestation.
 |
| 1. Seed collection equipmentmay include but not limited to:
 | * Binoculars.
* Magnifying lens.
* Climbing gear.
* Pruning shears.
* Secateurs
* Panga
* Collection bags
* Pruning knife
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Public relations
* Time management.

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Strategic planning
* resource allocation
* coordination of people and resources
* Tools and equipment.
* Maintenance of tools and equipment.
* Tree seed handbook.
* ISTA guidelines.
* KFSC guidelines.
* Tree propagation.
* Clonal propagation handbook.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Properly identified seed sources are inspected on status in readiness for seed collection.
	2. Correctly collected the seed samples for testing.
	3. Applied appropriate propagation method.
	4. Correctly identified trees suitable for the different purposes.
	5. Evaluated tree species common in the region.
	6. Collected data on different tree species
	7. Compiled common tree species into a database of based on tree taxonomy and nomenclature.
 |
| 1. Resource Implications
 | Resources the same as that of workplace are advised to be applied.These resources include:* 1. Tree seed books.
	2. Tools and equipment.
	3. Operational funds.
 |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## MANAGE TREE NURSERY

**UNIT CODE:** FO/OS/EN/CR/02/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in establishing and managing tree nursery. Competencies includes: Identifying tree nursery site, preparing tree nursery site, constructing tree nursery structures, acquiring nursery inputs, performing nursery production operations, ensuring nursery security, compiling nursery records.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***(Bold and italicised terms are elaborated in the Range)*** |
| 1. Identify and prepare tree nursery site.
 | * 1. Identified tree nursery site as per the set nursery conditions.
	2. Assembled ***nursery tools and equipment*** as per SOPs.
	3. Engaged labour as per workplace policies.
	4. Cleared nursery site to remove unwanted material as per workplace procedures.
 |
| 1. Construct tree nursery structures.
 | * 1. Assembled tree ***nursery construction materials*** as per workplace practice.
	2. Planned nursery site layout as per nursery establishment guidelines.
	3. Implemented nursery layout plan as per nursery establishment guidelines.
 |
| 1. Acquire nursery inputs.
 | * 1. Acquired fertile/farm soils as per nursery establishment guidelines.
	2. Acquired compost manure and fertilizers as per nursery establishment guidelines.
	3. Procured certified tree seed and planting materials as per workplace procedures.
	4. Sourced for sufficient water supply as per nursery establishment guidelines.
	5. Acquired nursery ***potting materials*** as per nursery establishment guidelines.
 |
| 1. Perform nursery production operations.
 | * 1. Potted nursery tubes as per nursery management guidelines.
	2. Watered nursery beds as per nursery management guidelines.
	3. Performed root pruning as per nursery management guidelines.
	4. Sowed nursery seeds as per nursery management guidelines.
	5. Transplanted seedlings as per nursery management guidelines.
	6. Pricked out seedlings as per nursery management guidelines.
	7. Controlled nursery weeds as per nursery management guidelines.
	8. Controlled pests and diseases in nursery production operations as per nursery management guidelines.
	9. Maintained nursery records as per workplace practices.
 |
| 1. Ensure nursery security.
 | * 1. Erected fence(s) around nursery as per SOPs.
	2. Hired human labour to provide security in the nursery as per workplace policies.
 |
| 1. Compile nursery records.
 | * 1. Acquired ***nursery record keeping books*** as per workplace procedures.
	2. Updated nursery records as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Nursery tools and equipment may include but not limited to:
 | * Drums
* Stirring rod
* Crates
* Hand trowel
* Pots
* Canvas
* Shakers
* Spade
* Sacks
* Trays
* Polythene sheets
* Wheelbarrow
* Weighing scale
* Personal Protective equipment and clothing
 |
| 1. Nursery construction materialsmay include but not limited to:
 | * Iron sheets.
* Nails.
* Timber.
* Ballast.
* Sand.
* Wheelbarrow.
* Cement
* Hand saws.
* Hammer.
* Chain links.
* Posts.
* Water.
 |
| 1. Potting materialsmay include but not limited to:
 | * Polytubes.
* Tins.
* Basket pots.
 |
| 1. Nursery record keeping booksmay include but not limited to:
 | * Nursery diary.
* Nursery seed book.
* Master roll.
* Asset register.
* Nursery cost ledger.
* Nursery labour register.
 |

**REQUIRED KNOWLEDGE AND SKILLS.**

**Required Knowledge.**

The individual needs to demonstrate knowledge of following:

* Tools and equipment.
* Nursery manuals.
* Strategic planning
* resource allocation
* Coordination of people and resources
* Sowing methods.
* Nursery establishment and management guidelines.
* Seed/Seedling handling techniques.

**Required Skills.**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Public relations
* Time management.
* Record keeping.
* Numeracy.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Correctly identified the location of tree nursery site.
	2. Correctly designed and laid out tree nursery structures.
	3. Appropriately managed daily tree nursery operations.
	4. Correctly complied and maintained tree nursery records.
 |
| 1. Resource Implications
 | Resources the same as that of workplace are advised to be applied.Resources include:* 1. Nursery manuals and guidelines.
	2. Nursery record keeping books.
	3. Nursery tools, equipment and materials.
	4. Operational funds.
 |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## IMPLEMENT FOREST SILVICULTURAL OPERATIONS.

**UNIT CODE:** FO/OS/EN/CR/03/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in implementing silvicultural operations. Competencies include Preparing tree planting site, planting tree seedlings, monitoring tree survival, maintaining tree seedlings, implementing pruning schedule, implementing thinning schedule, keeping compartment registers and conducting forest soil conservation activities.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***(Bold and italicised terms are elaborated in the Range)*** |
| 1. Prepare tree planting site
 | * 1. Identified tree planting site(s) as per Forest Service Technical Orders (FSTOs).
	2. Cleared tree planting site using appropriate clearing methods.
	3. Stakes are cut for marking purposes as per SOPs.
	4. Transported stakes to the planting sites as per SOPs.
	5. Performed staking out as per SOPs.
	6. Performed pitting as per SOPs.
 |
| 1. Plant tree seedlings
 | * 1. Transported tree seedlings to the planting site as per workplace procedures.
	2. Mobilized tree planting team as per workplace procedures.
	3. Demonstrated planting procedures to the planting team as per workplace procedures.
	4. Planted tree seedlings as per workplace procedures.
 |
| 1. Maintain and monitor tree seedling survival.
 | * 1. Carried out spot weeding as per SOPs.
	2. Carried out ***cleaning practices*** as per SOPs.
	3. Carried out survival count as per SOPs.
	4. Implemented beating up of seedlings as per SOPs.
	5. Protected the planted site as per workplace guidelines.
	6. Controlled pests and diseases in the planted sites as per workplace procedures.
 |
| 1. Implement pruning schedule.
 | * 1. Identified the plantations to be pruned as per SOPs.
	2. Assembled tools for pruning as per SOPs.
	3. Mobilized labour for pruning as per workplace procedures.
	4. Demonstrated pruning procedures to the pruning team as per SOPs.
	5. Pruned the trees as per SOPs.
 |
| 1. Implement thinning schedule.
 | * 1. Identified the plantations to be thinned as per SOPs.
	2. Assembled tools for thinning as per SOPs.
	3. Mobilized labour for thinning as per labour regulations.
	4. Demonstrated thinning procedures to the thinning team as per SOPs.
	5. Thinned the trees as per SOPs.
 |
| 1. Keep compartment registers.
 | * 1. Acquired compartment register sheets as per SOPs.
	2. Filled and updated compartment registers as per SOPs.
 |
| 1. Implement forest soil conservation activities.
 | * 1. Identified forest soil types and characteristics as per FAO guidelines.
	2. Evaluated soils, soil mixes and growing media for density, organic content, nutrient status, and physical and chemical properties as per workplace procedures.
	3. Identified problems affecting forest soils as per workplace procedures.
	4. Selected appropriate soil management and conservation measures as per workplace procedures.
	5. Implemented soil management and conservation measures as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

| **Variable** | **Range** |
| --- | --- |
| 1. Cleaning practicesmay include but not limited to: | * Manual cleaning.
* Chemical cleaning.
* Mechanical cleaning.
* Biological control.
 |

**REQUIRED SKILLS AND KNOWLEDGE.**

**Required Skills.**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Public relations
* Time management.
* Record keeping.
* Numeracy.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* FSGOs guidelines.
* Tools and equipment.
* Strategic planning
* Resource allocation
* Coordination of people and resources
* Standard Operating Procedures.
* Soil management and conservation.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Correctly planted tree seedlings.
	2. Appropriately implemented pruning activities.
	3. Appropriately implemented thinning activities.
	4. Monitored tree seedling survival.
	5. Compiled compartment registers.
	6. Correctly identified forest soil types and characteristics.
	7. Correctly identified problems affecting forest soils.
	8. Appropriately selected soil management and conservation measures.
	9. Implemented soil management and conservation measures.
 |
| 1. Resource Implications
 | Resources the same as that of workplace are advised to be applied.Resources include:* 1. Materials, tools and equipment.
	2. FSGOs.
	3. Operation funds.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:* 1. Oral questioning.
	2. Written test.
	3. Observation.
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **MANAGE FOREST ECOSYSTEMS**

**UNIT CODE:** FO/OS/EN/CR/04/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing forest ecosystem. Competencies includes: Identifying forest structure, evaluating forest types, assessing forest status, evaluating forest resources, assessing forest use values, rehabilitating degraded sites, building forest stakeholder capacity and managing natural resource conflicts.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Identify forest types.
 | * 1. Acquired forest resource maps as per Survey of Kenya guidelines.
	2. Delineated forest areas as per workplace procedures
	3. Identified ***forest types*** as per ecological classification
	4. Identified different forest structures based on ecological classification
 |
| 1. Evaluate forest types.
 | * 1. Identified different tree and other plant species based on ecological indices.
	2. Analysed tree and other plant species composition and diversity based on ecological classification.
	3. Identified forest threats based on socio ecological indices
	4. Classified forest types and ***conservation status*** based on ecological classification.
 |
| 1. Evaluate forest resources.
 | * 1. Identified mapped forest area as per survey maps.
	2. Identified forest resources as per IUCN guidelines.
	3. Established forest resource inventories as per workplace procedures.
	4. Analysed forest resources in gazetted forests as per workplace procedures.
	5. Analysed forest resources on farmlands as per workplace procedures.
 |
| 1. Manage and rehabilitate degraded sites
 | * 1. Applied silvicultural systems in regenerating natural forest as per FAO guidelines.
	2. Identified degraded sites as per FAO guidelines.
	3. Classified degraded sites as per FAO guidelines.
	4. Identified forest rehabilitation strategies based on ecological classification.
	5. Mobilized stakeholders to rehabilitate degraded sites as per PFM guidelines.
	6. Planned for rehabilitation as per site requirements.
	7. Acquired materials for rehabilitation as per site requirements.
	8. Implemented rehabilitation plan as per SOPs.
 |
| 1. Build forest stakeholder capacity.
 | * 1. Identified stakeholders as per SOPs.
	2. Sensitized stakeholders on forest ecosystem management as per SOPs.
	3. Outlined benefit sharing mechanism as per FCMA (2016).
	4. Outlined roles and responsibilities of each stakeholder as per FCMA (2016).
 |
| 1. Manage natural resource conflicts.
 | * 1. Identified sources and types of conflicts as per workplace procedures.
	2. Identified parties (stakeholders) involved in the conflicts as per workplace procedures.
	3. Identified ***conflict resolution strategies*** as per workplace procedures.
	4. Implemented effective strategies in conflict resolution as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest typesmay include but not limited to:
 | * Closed canopy.
* Woodlands.
* Grassland.
* Mixed.
* Mountainous.
* Coast.
* Afro-montane.
* Guineo-Congolian.
 |
| 1. Conservation statusmay include but not limited to:
 | * Pristine.
* Moderately degraded.
* Heavily degraded.
 |
| 1. Conflict resolution strategies may include but not limited to:
 | * Avoidance.
* Mediation.
* Adjudication.
* Negotiation.
* Arbitration.
* Coercion.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Report writing
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Public relations
* Time management.
* Record keeping.
* Negotiation.
* Networking.
* Analytical.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* FSGOs guidelines.
* Tools and equipment.
* Strategic planning
* Resource allocation
* Coordination of people and resources
* Standard Operating Procedures.
* FCMA (2016).
* PFM guidelines.
* IUCN guidelines.
* Forest ecosystem classification guidelines.
* Conflict resolution strategies.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Correctly identified forest conservation status.
	2. Correctly identified forest degradation areas.
	3. Correctly applied regeneration techniques.
	4. Appropriately determined types of forest resources.
	5. Carried out rehabilitation activities.
	6. Appropriately implemented most effective strategies in conflict resolution as per workplace procedures
	7. Appropriately engaged stakeholders in forest ecosystem management.
 |
| 1. Resource implications
 | Resources the same as that of workplace are advised to be applied.Resources include:* 1. Operation funds.
	2. Maps.
	3. Law and Policy documents.
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **CONDUCT FOREST INVENTORY AND VALUATION**

**UNIT CODE:** FO/OS/EN/CR/05/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in conducting forest inventory and valuation. Competencies includes: Assembling forest mensuration and inventory equipment, determining forest mensuration methods, determining forest inventory methods, quantifying forest resources, determining the value of ecosystems goods and services.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Assemble forest mensuration and inventory equipment.
 | * 1. Identified forest mensuration equipment as per SOPs.
	2. Identified forest ***inventory equipment*** as per SOPs.
	3. Assembled forest mensuration and inventory equipment as per SOPs.
 |
| 1. Determine forest mensuration and inventory methods.
 | * 1. Developed data collection plan for mensuration and inventory as per workplace practice.
	2. Gathered ***mensuration*** and ***inventory*** ***tools*** as per workplace practices.
	3. Determined ***sampling methods*** for forest inventory as per SOPs.
	4. Conducted tree measurements activities as per SOPs.
	5. Collected inventory data as per workplace practices.
	6. Analysed inventory data using inventory formulae as per SOPs.
 |
| 1. Quantify forest resources.
 | * 1. Analysed inventory data using inventory formulae as per SOPs.
	2. Conducted inventory for NTFPs as per workplace practices.
	3. Analysed data for forest resources as per SOPs.
	4. Reported on forest inventory
 |
| 1. Determine the value of ecosystems goods and services.
 | * 1. Identified scope of the ecosystem to be valued as per workplace procedures.
	2. Identified goods and services derived from the ecosystem as per workplace procedures.
	3. Quantified goods and services from the ecosystem as per workplace procedures.
	4. Determined the unit value of goods and services from the ecosystem as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Inventory equipment may include but not limited to:
 | * Clipboards.
* Diameter tapes.
* Linear tapes.
* Hypsometers.
* Relascope.
 |
| 1. Mensuration toolsmay include but not limited to:
 | * Hypsometers.
* Clinometers.
* Diameter tapes.
* Diameter calipers.
* Linear tapes.
 |
| 1. Sampling methodsmay include but not limited to:
 | * Random sampling.
* Stratified sampling.
* Systematic sampling.
* Point sampling**.**
* Plot sampling.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Public relations
* Time management.
* Record keeping.
* Numeracy.
* Analytical.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Tools and equipment.
* Strategic planning
* Resource allocation
* Coordination of people and resources
* Standard Operating Procedures.
* Multiple uses and benefits of ecosystems.
* Measuring techniques.
* Sampling techniques.
* Data collection and analysis procedures.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Identified forest mensuration equipment as per SOPs.
	2. Identified forest inventory equipment as per SOPs.
	3. Conducted mensuration activities as per SOPs.
	4. Prepared inventory data collection plan.
	5. Collected inventory data as per workplace practices.
	6. Analyzed inventory data using inventory formulae as per SOPs.
	7. Determined the unit value of goods and services from the ecosystem
 |
| 1. Resource implications
 | Resources the same as that of workplace are advised to be applied.Resources include:* 1. Mensuration and inventory tools.
	2. Operational funds
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
7. Project
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **MANAGE FOREST ENGINEERING OPERATIONS**

**UNIT CODE:** FO/OS/EN/CR/06/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing forest engineering operations. Competencies include: Assembling forest engineering operations tools, surveying forest engineering needs, planning forest engineering operations, implementing forest engineering operations and maintaining forest infrastructure.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Assemble forest engineering operations tools.
 | * 1. Identified ***forest engineering tools*** as per SOPs.
	2. Demonstrated knowledge of use of forest engineering tools as per SOPs.
	3. Maintained forest engineering tools as per SOPs.
 |
| 1. Survey needs and plan forest engineering operations.
 | * 1. Identified types of ***infrastructural developments*** required based on workplace policies.
	2. Determined ***standards for infrastructural requirements*** in forest engineering operations as per workplace policies.
	3. Carried out needs’ assessment for forest engineering operations as per workplace procedures.
	4. Selected site for each infrastructural development as per workplace policies.
	5. Estimated costs for each infrastructural development as per SOPs.
	6. Acquired infrastructure plans as per workplace procedures.
	7. Interpreted structural drawings for each infrastructural development as per workplace policies.
 |
| 1. Implement forest engineering operations.
 | * 1. Mobilized forest infrastructure tools and equipment as per workplace policies.
	2. Ensured availability of labour for forest infrastructure development as per workplace policies.
	3. Supervised forest engineering operations as per workplace policies.
	4. Registered forest infrastructural development as per SOPs.
 |
| 1. Maintain forest infrastructure.
 | * 1. Inspected forest infrastructure as per workplace procedure.
	2. Developed plan to maintain forest infrastructure as per workplace procedures.
	3. Executed maintenance plan as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest engineering toolsmay include but not limited to:
 | * GPS
* Tractors.
* Graders.
* Drum rollers.
* Concrete mixers.
* Lorries.
* Theodolite.
* Ranging rods.
* Linear tape measures.
 |
| 1. Infrastructural developmentmay include but not limited to:
 | * Roads; earthen, gravel, inspection path.
* Bridges; temporary suspension, wooden beam, wooden cantle bridges.
* Culverts.
* Buildings; concrete houses, permanent and pre-fabricated houses.
 |
| 1. Standards for infrastructural requirementsmay include but not limited to:
 | * Building code.
* Roads code.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.
* Numeracy.
* Interpretation.
* Analytical.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Soil science.
* Engineering.
* Tools and equipment.
* Survey and mapping.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Demonstrated knowledge of use of forest engineering tools.
	2. Interpreted drawings for each infrastructural development.
	3. Selected site for each infrastructural development.
	4. Estimated costs for each infrastructural development.
	5. Supervised forest engineering operations.
	6. Maintained forest infrastructure.
 |
| 1. Resource implications
 | Resources the same as that of workplace are advised to be applied.Resources include:* 1. Forest engineering tools and equipment.
	2. Standard operating manuals.
	3. Operation funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Direct observation
	2. Oral questioning
	3. Written tests
	4. Third party reports.
	5. PoE
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **MANAGE FOREST PESTS AND DISEASES**

**UNIT CODE:** FO/OS/EN/CR/07/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing forest pests and diseases. Competencies includes: Identify common forests pests and diseases, identify plant disease signs and symptoms, identify pest and disease control methods, monitor forest pest and disease incidences, report forest pest and disease incidences.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Survey common forests pests, diseases and plant disease signs and symptoms.
 | * 1. Identified common forest pests as per pest collection reference manual and insectivore.
	2. Identified common forest diseases as per manual for common forest disease.
	3. Identified signs and symptoms associated with pest’s infestation as per KEFRI Technical note No. 49.
	4. Identified signs and symptoms associated with plant diseases as per KEFRI Technical note No. 49.
	5. Analysed effects of pests and diseases attack on plants as per KEFRI Technical note No. 49.
 |
| 1. Implement pest and disease control methods.
 | * 1. Evaluated effects of common pests on host species as per KEFRI Technical Note No. 49.
	2. Evaluated effects of common diseases on host species as per KEFRI Technical Note No. 49.
	3. Identified appropriate pest control methods as per KEFRI Technical Note No. 49
	4. Identified appropriate disease control methods as per KEFRI Technical Note No. 49.
	5. Assembled ***tools, equipment and materials*** for pest and disease control as per SOPs.
	6. Executed appropriate ***pest and disease control methods*** as per SOPs.
 |
| 1. Monitor and report forest pest and disease incidences.
 | * 1. Developed monitoring schedule for pests as per workplace procedures.
	2. Developed monitoring schedule for diseases as per workplace procedures.
	3. Conducted pest and disease surveillance as per workplace procedures.
	4. Compiled monitoring report for pests as per workplace procedures.
	5. Compiled monitoring report for diseases as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Pest control tools, equipment and materials may include but not limited to:
 | * Pesticides.
* Fungicides.
* Sprayers.
* Herbicides.
* Magnifying lens.
* Insect trap net.
* PPEs.
 |
| 1. Pest and disease control methods may include but not limited to:
 | * Chemical methods.
* Biological methods.
* Mechanical methods.
* Silvicultural measures.
* Genetic breeding.
* Integrated Pest Management.
* Legal methods (Quarantine).
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Plant pests and diseases.
* Entomology.
* Pathology.
* Botany.
* Pest and disease control methods.
* Pest and disease control tools, equipment and materials.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Demonstrated knowledge on identification of common pests and diseases.
	2. Demonstrated knowledge on appropriate pest and disease control measures.
	3. Demonstrated knowledge on evaluation of effects of common pests and diseases.
	4. Compiled monitoring report for pests as per workplace procedures.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Pest and disease control tools, equipment and materials.
	2. Manuals and guidelines. (KEFRI Technical Note No. 49, insectivore).
	3. Operational funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Direct observation
	2. Oral questioning
	3. Written tests.
	4. Portfolio of Evidence
	5. Project
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **MANAGE FOREST HARVESTING AND LOGGING**

**UNIT CODE:** FO/OS/EN/CR/08/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing forest harvesting and logging. Competencies includes: Assembling forest harvesting and logging tools, surveying forest logging area, executing appropriate logging methods, supervising harvesting of NTFPs.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Survey forest logging area.
 | * 1. Carried out needs’ assessment of forest logging area as per workplace procedures.
	2. Prepared felling plan as per workplace practice.
	3. Selected logging site from the felling plan as per workplace practice.
 |
| 1. Assemble forest harvesting and logging tools.
 | * 1. Identified ***forest harvesting and logging tools*** as per workplace policies.
	2. Acquired forest harvesting and logging tools as per workplace policies.
	3. Demonstrated knowledge on use of forest harvesting and logging tools.
	4. Maintained and serviced forest harvesting and logging tools as per workplace procedures.
 |
| 1. Execute appropriate logging methods.
 | * 1. Identified appropriate ***logging methods*** as per workplace practice.
	2. Planned logging activities as per workplace practice.
	3. Mobilized forest harvesting and logging equipment and labour as per workplace policies.
	4. Conducted logging activities as per workplace policies.
	5. Conducted post logging activities as per workplace policies.
 |
| 1. Supervise harvesting of NTFPs.
 | * 1. Identified appropriate ***harvesting procedures*** as per workplace practice.
	2. Identified ***NTFPs*** as per NTFP extraction guidelines.
	3. Demonstrated knowledge on appropriate NTFPs harvesting tools as per workplace policies.
	4. Ensured NTFPs are harvested as per NTFP extraction guidelines.
	5. Compiled reports on harvested NTFPs as per workplace practices.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest harvesting and logging toolsmay include but not limited to:
 | * Panga.
* Hand hoe.
* Power saw.
* Winch.
* Tractor
* Timber jack.
* Tele logger machine.
* PPEs.
* Measuring sticks.
 |
| 1. Logging methodsmay include but not limited to:
 | * Clear fell/clear cut.
* Selection cutting.
* Strip felling.
 |
| 1. Harvesting proceduresmay include but not limited to:
 | * Use of power saw.
* Use of bow saws.
* Use of hand axe.
* Use of eco log machines.
 |
| 1. NTFPs/NWFPs may include but not limited to:
 | * Bamboo.
* Honey.
* Fruits.
* Fodder.
* Fuel.
* Gums and resins.
* Nuts.
* Medicinal plants and herbs.
* Frankincense.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Technical report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Harvesting and logging tools and equipment.
* Harvesting and logging techniques.
* NTFPs.
* Tree management.
* NTFPs extraction guidelines.
* Botany.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Demonstrated knowledge on use of forest harvesting and logging tools.
	2. Maintained and serviced forest harvesting and logging tools.
	3. Mobilized forest harvesting and logging equipment and labour.
	4. Conducted logging activities.
	5. Conducted post logging activities.
	6. Ensured NTFPs are harvested.
	7. Compiled reports on harvested NTFPs as per workplace practices.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. NTPFs guidelines.
	2. Harvesting and logging tools and equipment.
	3. PPEs.
	4. Operation funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Direct observation
	2. Oral questioning
	3. Written tests.
	4. Portfolio of Evidence
	5. Interview
	6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **UNDERTAKE WOOD UTILIZATION AND PROCESSING**

**UNIT CODE:** FO/OS/EN/CR/09/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in undertaking wood utilization and processing. Competencies includes: processing forest end products and by products, ensuring standard compliance in production, applying knowledge of value addition on forest products, applying knowledge of chain of product distribution.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Process forest end products and by-products.
 | * 1. Collected ***forest raw materials*** as per workplace procedures.
	2. Classified forest materials/products for processing as per workplace procedures.
	3. Mobilized labour to process forest end products as per workplace procedures.
	4. Assembled ***tools and machines*** ***for processing*** forest materials as per workplace procedure.
	5. Carried out conversion of wood into timber and by-products as per workplace procedures.
 |
| 1. Ensure standard compliance in processing.
 | * 1. Identified the standards in processing as per SOPs.
	2. Ensured compliance to standards during processing as per SOPs.
	3. Graded forest end products by quality for different markets as per SOPs.
 |
| 1. Apply knowledge of value addition on forest products.
 | * 1. Identified forest products for value addition as per workplace procedures.
	2. Applied relevant processes of value addition on forest products as per workplace procedures.
	3. Ensured ***compliance to*** ***standards*** during value addition as per SOPs.
 |
| 1. Apply knowledge of chain of product distribution.
 | * 1. Identified market availability of forest products as per basic principles of economics.
	2. Identified market structure of forest products as per basic principles of economics.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest raw materialsmay include but not limited:
 | * Tree logs.
* Poles.
* Resins.
* Cut stones.
* Water.
* Grass.
* Herbs.
* Medicinal plants.
* Bark.
 |
| 1. Processing tools and machines may include but not limited:
 | * Power saw.
* Cross cut saw.
* Wood miser.
* Saw bench.
* Ply wood machine.
* Particle board machines.
* Medium density fibre board machines.
* Paper making machine.
* Quarrying machines.
 |
| 1. Compliance standards may include but not limited:
 | * Kenya Bureau of Standards.
* Forest Stewardship Council.
* ISO certified standards.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Performance Management
* Report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Processing tools and equipment.
* Demand and supply.
* Marketing structure.
* Processing techniques.
* Botany.
* Multiple use and benefits of trees.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Classified forest raw materials for processing.
	2. Assembled tools and machines for processing forest raw materials.
	3. Carried out conversion of raw materials into timber and by-products.
	4. Ensured compliance to standards during value addition.
	5. Demonstrated knowledge on market trends of forest products.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Extraction and Processing tools and machines.
	2. Timber processing manuals.
	3. Operation funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:* 1. Oral questioning
	2. Written tests
	3. Portfolio of Evidence
	4. Interview
	5. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **CONDUCT FOREST EXTENSION**

**UNIT CODE:** FO/OS/EN/CR/10/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in conducting forest extension and agroforestry. Competencies includes: Identifying forest extension beneficiaries, coordinating forest extension services, generating information and technologies to disseminate, identifying dissemination methods, establishing extension feedback mechanisms and performing agroforestry activities.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Identify forest extension beneficiaries.
 | * 1. Collected data on community forestry needs as per workplace procedures.
	2. Analysed data on community forestry needs as per workplace procedures.
	3. Classified beneficiaries of forest extension as per workplace procedures.
	4. Ranked ***community forestry needs*** as per workplace procedures.
	5. Advised stakeholders on the appropriate strategies to meet their forestry needs as per workplace procedures.
 |
| 1. Coordinate forest extension services.
 | * 1. Identified appropriate forestry ***extension methods*** based on the beneficiaries of forest extension.
	2. Prepared forest extension plans as per workplace procedures.
	3. Implemented forest extension service plans as per workplace procedures.
	4. Monitor forest extension service plans as per workplace procedures.
 |
| 1. Disseminate information on forestry needs.
 | * 1. Identified community forestry needs as per workplace procedures.
	2. Developed information for dissemination to meet community forestry needs as per workplace procedures.
	3. Identified appropriate information ***dissemination methods*** as per workplace procedures.
	4. Disseminated information on community forestry issues as per workplace procedures.
	5. Established extension feedback/evaluation mechanisms as per workplace procedures.
 |
| 1. Perform agroforestry activities.
 | * 1. Identified community/social and urban forestry needs as per workplace procedures.
	2. Selected suitable species for different ***agroforestry practices*** as per workplace procedures.
	3. Selected suitable species for alternative tree planting practices as per workplace procedures.
	4. Selected suitable species for horticulture and animal farming along with tree crops as per workplace procedures.
	5. Developed a plan to implement different agroforestry projects as per workplace procedures.
	6. Implemented the different agroforestry projects as per workplace procedures.
	7. Monitored and evaluated agroforestry projects as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Community forest needs may include but not limited to:
 | * Timber.
* Conservation.
* Medicinal.
* Soil erosion control.
* Soil fertility improvement.
* Fodder.
* Fuel wood.
* Fruits.
* Air purification.
 |
| 1. Extension methods may include but not limited to:
 | * Individual (home visits).
* Group.
* Training.
* Demonstration.
* Field trips and tours.
 |
| 1. Dissemination methods may include but not limited to:
 | * Mass communication (radio, baraza, TV, posters, road shows).
* Extension campaigns.
* Trainings; on-site/ demos.
 |
| 1. Agroforestry practices may include but not limited to:
 | * Agro-silviculture.
* Aquaculture.
* Apiculture.
* Agro-silvo-pasture.
* Silviculture.
* Silvopastoral.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Report writing
* Controlling
* Coordinating/ Facilitation.
* Negotiation.
* Presentation.
* Mobilization.
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.
* Conflict resolution.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Gender mainstreaming.
* Plant taxonomy.
* Soils and geology.
* Soil conservation.
* Cultural beliefs and attitudes.
* Communication and dissemination strategies.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Demonstrated knowledge agroforestry systems and practices.
	2. Appropriately collected and analysed data on community forestry needs.
	3. Correctly advised stakeholders on the appropriate strategies to meet their forestry needs.
	4. Appropriately applied alternative tree planting practices.
	5. Appropriately identified forestry extension methods.
	6. Appropriately identified information dissemination methods.
	7. Appropriately conducted monitoring and evaluation on forest extension programs.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Audio visual equipment e.g. projectors, microphones.
	2. Training materials e.g. tripods, charts.
	3. Transport (vehicles, motor cycles).
	4. Operational funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## MANAGE AGROFORESTRY SYSTEMS.

**UNIT CODE:** FO/OS/EN/CR/11/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing agroforestry systems. Competencies includes: Identifying appropriate agroforestry systems, designing agroforestry systems, coordinate agroforestry practices, generating agroforestry information and technologies to disseminate, identifying dissemination methods, establishing extension feedback mechanisms.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Identify appropriate agroforestry systems.
 | * 1. Collected data on ***community agroforestry needs*** as per workplace procedures.
	2. Collected data on the ***potential benefits of agroforestry systems*** as per workplace procedures.
	3. Analysed data on community forestry needs as per workplace procedures.
	4. Ranked community forestry needs as per workplace procedures.
	5. Evaluated land characteristics, such as topography, soil fertility and climate and other environmental conditions as per workplace procedures.
	6. Identified available resources such as land, labour, technology and capital for agroforestry systems as per workplace procedures.
	7. Classified beneficiaries of agroforestry as per workplace procedures.
	8. Selected appropriate agroforestry system as per workplace procedures.
 |
| 1. Design agroforestry systems.
 | * 1. Identified factors to consider when designing an agroforestry system as per workplace procedures.
	2. Collected data on land tenure/ownership which affects feasibility of agroforestry designs as per workplace procedures.
	3. Identified land sizes available for agroforestry and their location as per workplace procedures.
	4. Collected data on environmental factors such as climate, soil, drainage, sunlight and precipitation that determine the agricultural crops and livestock that can be grown or raised as per workplace procedures.
	5. Designed suitable agroforestry system as per SOPs.
 |
| 1. Coordinate agroforestry practices.
 | * 1. Selected suitable species for different ***agroforestry practices*** as per workplace procedures.
	2. Selected suitable species for ***alternative tree planting practices*** as per workplace procedures.
	3. Selected suitable species for horticulture and animal farming along with tree crops as per workplace procedures.
	4. Developed plan to implement different agroforestry projects as per workplace procedures.
	5. Implemented the different agroforestry projects as per workplace procedures.
	6. Monitored and evaluated agroforestry projects as per workplace procedures.
 |
| 1. Disseminate information on agroforestry.
 | * 1. Identified community forestry needs as per workplace procedures.
	2. Developed information for dissemination to meet community and individual needs as per workplace procedures.
	3. Identified appropriate information ***dissemination methods*** as per workplace procedures.
	4. Disseminated information on community agroforestry issues as per workplace procedures.
	5. Established extension feedback/evaluation mechanisms as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Community agroforestry needs may include but not limited to:
 | * Timber.
* Conservation.
* Medicinal.
* Soil erosion control.
* Soil fertility improvement.
* Fodder.
* Fuel wood.
* Fruits.
* Air purification.
 |
| 1. Potential benefits of agroforestry systems may include but not limited to:
 | * Timber.
* Conservation.
* Medicinal.
* Soil erosion control.
* Soil fertility improvement.
* Fodder.
* Fuel wood.
* Fruits.
 |
| 1. Agroforestry practices may include but not limited to:
 | * Agro-silviculture.
* Aquaculture.
* Apiculture.
* Agro-silvo-pasture.
* Silviculture.
* Silvopastoral.
 |
| 1. Dissemination methods may include but not limited to:
 | * Mass communication (radio, baraza, TV, posters, road shows).
* Extension campaigns.
* Trainings; on-site/ demos.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Report writing
* Controlling
* Coordinating/ Facilitation.
* Negotiation.
* Presentation.
* Mobilization.
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.
* Conflict resolution.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Gender mainstreaming.
* Plant taxonomy.
* Soils and geology.
* Soil conservation.
* Cultural beliefs and attitudes.
* Communication and dissemination strategies.
* Extension methods

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Demonstrated knowledge agroforestry systems and practices.
	2. Appropriately collected and analysed data on community and individual agroforestry needs.
	3. Selected appropriate agroforestry tree species
	4. Appropriately applied alternative tree planting practices.
	5. Appropriately identified agroforestry extension methods.
	6. Appropriately identified information dissemination methods.
	7. Appropriately conducted monitoring and evaluation on agroforestry systems.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Audio visual equipment e.g. projectors, microphones.
	2. Training materials e.g. tripods, charts.
	3. Transport (vehicles, motor cycles).
	4. Operational funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **ENFORCE FOREST LAW AND POLICY**

**UNIT CODE:** FO/OS/EN/CR/12/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in enforcing forest policy and law. Competencies include interpreting relevant forest law and policy, implementing forest law and policy conducting training on forest law and policy, sensitizing stakeholders on forest law and policy, following up on compliance of forest laws and policy and implementing administrative procedures.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Interpret and implement forest law and policy.
 | * 1. Appropriate forest management law and policy are identified as per workplace procedures.
	2. Appropriate forest management law and policy are interpreted in as per workplace procedures.
	3. ***Forest law and policy*** are applied appropriately in forest management as per workplace procedures.
	4. Forest law and policy gaps are identified as per workplace procedures.
	5. Forest law and policy gaps are compiled and submitted for review as per workplace procedures.
 |
| 1. Conduct training on forest law and policy.
 | * 1. Training needs assessment is carried out as per workplace procedures.
	2. Stakeholders to be trained on forest law and policy are identified as per workplace procedures.
	3. Training plan is prepared as per workplace procedures.
	4. Training plan is implemented as per workplace procedure.
	5. Training report is compiled as per workplace procedures.
 |
| 1. Sensitize stakeholders on forest law and policy.
 | * 1. Identified target groups for forest law and policy sensitization as per workplace procedures.
	2. Identified specific issues/needs on forest law and policy for sensitization based on the target groups.
	3. Mobilized target groups for forest law and policy sensitization as per workplace procedures.
	4. Appropriate ***sensitization strategies*** are identified as per workplace procedures.
	5. Sensitization on identified forest law and policy issues is conducted as per workplace procedures.
	6. Monitoring and evaluation on impact of sensitization on forest law and policy is carried out as per workplace procedures.
 |
| 1. Implement administrative procedures.
 | * 1. Budget is prepared as per workplace procedure.
	2. Procurement plan is prepared as per workplace procedures.
	3. Inventory records are maintained as per workplace procedures.
	4. Ensured financial rules and regulations are adhered to during office operations as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest law and policy may include but not limited to:
 | * Forest Conservation and Management Act 2016.
* Forest Policy 2014
* Environmental Management and Co-ordination (Amendment) Act 2015.
* Water Act 2015.
* Wildlife Management and Conservation Act 2013
 |
| 1. Sensitization strategies may include but not limited to:
 | * Trainings.
* Community meetings.
* Mass media (radio, TV, road shows).
* Print media (brochures, posters, newspapers).
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Report writing
* Controlling
* Coordinating/ Facilitation.
* Negotiation.
* Presentation.
* Mobilization.
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Record keeping.
* Conflict resolution.
* Analytical.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Forest law and policy.
* Other laws and policy related to forest management.
* Conflict management and resolution strategies.
* Stakeholder engagement.
* Sensitization strategies.
* Office management.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Appropriately identified relevant forest management law and policy.
	2. Appropriately applied and enforced forest law and policy.
	3. Appropriately applied forest law and policy in forest management.
	4. Conduct training and sensitization sessions on forest law and policy.
	5. Carried out monitoring and evaluation on impact of training and sensitization on forest law and policy.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Training materials.
	2. FCMA Act, 2016.
	3. Forest Policy 2014.
	4. Operational funds.
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **CONDUCT FOREST LAND SURVEY AND MAPPING**

**UNIT CODE:** FO/OS/EN/CR/13/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in conducting forest land survey and mapping. Competencies includes: preparing forest land map(s), demarcating forest land boundaries, preparing forest zonation maps and storing forest land and zonation maps.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Prepare forest land map(s).
 | * 1. Carried out reconnaissance survey on the forest land as per workplace procedures.
	2. Assembled ***forest land survey and mapping equipment*** as per workplace procedures.
	3. Identified area(s) to be mapped as per workplace procedures.
	4. Mobilized team for survey and mapping as per workplace procedures.
	5. Carried out forest land survey as per workplace procedures.
	6. Processed forest land survey data as per workplace procedures.
	7. Prepared forest land map(s) as per workplace procedures.
	8. Updated and stored forest land maps as per workplace procedures.
 |
| 1. Demarcate forest land boundaries.
 | * 1. Assembled forest land survey and mapping tools and equipment as per workplace procedures.
	2. Mobilized survey team for demarcation as per workplace procedures.
	3. Interpret existing forest land maps as per workplace procedures.
	4. Installed beacons on newly demarcated forest land as per workplace procedures.
	5. Replaced lost beacons on forest land as per workplace procedures.
 |
| 1. Prepare forest zonation maps.
 | * 1. Identified available resources in different forest blocks as per workplace procedures.
	2. Analysed forest local topographical maps as per workplace procedures.
	3. Collected data on the resources and their location as per workplace procedures.
	4. Delineated resource boundaries for different utilization types as per workplace procedures.
	5. Updated and stored forest zonation maps as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Forest land survey and mapping tools and equipment may include but not limited to: | * Pegs.
* Plane table and accessories.
* Ranging rods.
* Theodolite.
* GPS handsets.
* Measuring chain.
* Tape measure.
* Compass.
* Tripod.
* Notebooks.
* PPE
* 3D scanners.
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Planning
* Organizing
* Report writing
* Controlling
* Coordinating
* Problem solving
* Critical thinking
* Decision making
* Time management.
* Data management.
* Analytical.
* Numeracy.
* Presentation.
* Map drawing.

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Forest land survey mapping tools and equipment.
* Survey and map interpretation.

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Assembled and maintained forest land survey and mapping equipment.
	2. Correctly identified available resources in different forest blocks.
	3. Correctly performed different forest land survey activities.
	4. Correctly prepared forest land and zonation maps.
	5. Correctly interpreted forest land and zonation maps.
 |
| 1. Resource implications
 | The following resources must be provided:* 1. Forest land maps.
	2. Other resource maps.
	3. Operation funds.
	4. Forest land survey and mapping tools and equipment.
 |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **MANAGE FOREST FIRES**

**UNIT CODE:** FO/OS/EN/CR/14/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required in managing forest fires. Competencies include preparing to respond to fire, proceeding to fire, obtaining firefighting equipment and extinguishing media, combating wildfire, reacting to wildfire and weather conditions, participating in mop-up, patrol activities and support operations and conducting wildfire recovery process.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Conduct fire risk assessment.
 | * 1. Weather station is established as per workplace procedures.
	2. Monitoring of humidity, wind speed and temperature is carried out as per workplace procedures.
	3. Fire towers are constructed as per workplace procedures.
	4. ***Fire danger rating*** board is erected as per workplace procedures.
	5. Fire risk assessment reports are compiled as per workplace procedures.
 |
| 1. Prepare and respond to fire.
 | * 1. Information about location of fire, ***type of fire*** is obtained as per workplace procedures.
	2. Most effective route to the fire is established according to workplace procedures.
	3. ***Personal protective clothing and equipment***, and food and fluid requirements are identified and relevant preparations undertaken prior to departure as per organisational standards.
	4. Safety procedures are adhered to according to OSHA.
	5. Location of the fire and ***type of fuel*** is confirmed on approach based on fire safety procedures.
	6. Access to the area is gained safely without damage to vehicles and equipment, and minimum damage to the forest according to SOPs.
	7. ***Evidence relevant to fire*** cause is noted and brought to the attention of the supervisor according to workplace policies.
	8. ***Indicators of fire behaviour*** are observed and communicated efficiently in accordance with organization’s policies.
 |
| 1. Assemble firefighting equipment and extinguishing media.
 | * 1. Selected ***extinguishing media*** and ***firefighting equipment*** are located and obtained as per the workplace procedures.
	2. Equipment is used in accordance with organisational and manufacturer's procedures.
 |
| 1. Combat forest fire.
 | * 1. Mobilized firefighting team as per workplace procedures.
	2. Instructions are received, ***firefighting strategies*** ***and tactics*** are confirmed and implemented in accordance with organizational safe work practices and procedures.
	3. ***Fire suppression techniques***, equipment and extinguishing media appropriate to fire conditions are used.
	4. Fire control lines are prepared in accordance with team leader’s instructions.
	5. Equipment is positioned, made ready for use and protected from damage in accordance with organisational procedures.
	6. Fire is attacked taking into account ***fire hazards*** as directed and in accordance with organisational procedures.
	7. Evidence of fire cause and area of fire origin are protected.
	8. ***Communication*** is maintained at all times in accordance with organisational procedures.
 |
| 1. React to wildfire and weather conditions.
 | * 1. Conditions at the fire are observed and their effect on fire behaviour and development are noted and reported to supervisor.
	2. ***Weather conditions*** and changes to fire behaviour are observed and reported to team leader.
	3. ***Variations in topography, fuel features*** and fuel arrangements are observed and effect on fire behaviour is reported to team leader as required.
	4. ***Escape routes*** and ***safety zones*** are identified and maintained as per SOPs.
	5. Communication is maintained with other firefighting personnel and team leader throughout operational activities.
 |
| 1. Engage in mop-up, patrol activities and support operations.
 | * 1. Mopping-up activities are carried out as per workplace procedures.
	2. Patrol of the perimeter or sector of the fire is maintained as per workplace procedures.
	3. Activities to support firefighting operations are carried as per workplace procedures.
 |
| 1. Conduct wildfire recovery process.
 | * 1. Equipment and consumables are recovered as per workplace policies.
	2. Equipment is stored in accordance with organisational procedures.
	3. Cleaning and maintenance are carried out in accordance with organisational procedures.
	4. Damaged or lost equipment is reported in accordance with organisational procedures.
	5. Restoration of burnt area is planned and implemented as per workplace procedures.
 |

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

|  |  |
| --- | --- |
|  **VARIABLE**  | **RANGE** |
| 1. Type of fire may include but not limited to:
 | * crown
* ground
* surface
 |
| 1. Type of fuel may include but not limited to:
 | * crop
* forest
* grass
* heath
* peat, coal and combustible soils
* plantation
* scrub
* dead litter.
 |
| 1. Evidence relevant to fire cause may include but not limited to:
 | * fresh vehicles tracks
* items or objects at scene
* nature and behaviour of fire at the scene upon arrival
* nature and colour of smoke and number of columns
* people and vehicles leaving the scene
* whether gates on access routes to the fire are closed, opened or locked
 |
| 1. Indicators of fire behaviour may include but not limited to:
 | * flame height and length
* noise
* rate of spread
* smoke colour and density
	+ spotting
 |
| 1. Extinguishing media may include but not limited to:
 | * + water
	+ Class A foam
	+ retardants
	+ soil
	+ wetting agents
 |
| 1. Firefighting equipment may include but not limited to:
 | * drip torch
* hand tools
* hose and small gear
* knap sack
* pump
* tanker
* chainsaw
* ropes and lines
 |
| 1. Firefighting strategies may include but not limited to:
 | * defensive
* direct attack
* indirect attack
* offensive
* parallel attack
 |
| 1. Firefighting tactics may include but not limited to:
 | * backburning
* burning out
* control line construction
* mopping-up
* patrol
* use of extinguishing media
 |

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit of competency.

**Required Skills**

The individual needs to demonstrate the following skills:

* Detect hot spots, hazardous trees, unsecured wildfire perimeter
* Undertake dry and wet wildfire attack
* Use wildfire control tools and equipment
* Teamwork

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Personal protective equipment/safety gears
* Handling of firefighting tools, equipment and materials.
* Safety signs and symbols
* communication on the fireground
* extinguishing media, water, foam, suppressants
* fire behaviour (fuel, weather and topography)
* health and fitness requirements
* hygiene and wellbeing
* organisational operating procedures
* safe work practices
* wildfire control tactics and techniques
* wildfire hazards, safety techniques

**EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

|  |  |
| --- | --- |
| 1. Critical aspects of competency
 | Assessment requires evidence that the candidate:* 1. Adhered to safety procedures
	2. Identified firefighting tools, equipment and materials
	3. Appropriately used firefighting equipment
	4. Participated in dry wildfire control
	5. Effectively used extinguishing media in wildfire control
	6. Maintained health and safety of self, other workers and people in the immediate work area.
	7. Participated in mop-up and patrol.
	8. Safely undertook operational activities.
 |
| 1. Resource implications
 | The following resources must be provided:2.1 Work place location.2.2 Tools and equipment appropriate for firefighting.2.3 Materials relevant to the proposed activity/task2.4 Simulated field-based workplace environments. |
| 1. Methods of assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context for assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |