

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**APICULTURE MANAGER**

**LEVEL 6**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

First published 2019

© 2019, TVET CDACC

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

**Council Secretary/CEO**

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

**P.O. Box 15745–00100**

**Nairobi, Kenya**

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

# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya’s development blueprint 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 in 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 TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be basis 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 occupational standards have been developed.

It is my conviction that these occupational standards will play a great role towards development of competent human resource for the Agriculture Sector’s growth and development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

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

The Technical and Vocational Education and Training Act No. 29 of 2013 and the sessional paper No 14 of 2012 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labor force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Agriculture Sector Skills Advisory Committee (SSAC) have developed these occupational standards.

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, Agriculture SSAC, expert workers and all those who participated in the development of this occupational standards.

**CHAIRPERSON,**

**TVET CDACC**

# ACKNOWLEDGMENT

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

I recognize with appreciation the role of the Apiculture Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the standards. I also thank all stakeholders in the Apiculture sector for their valuable input and all those who participated in the process of developing these occupational standards.

I also recognize the support of the Netherlands’ funded NICHE project “Integrated Capacity Development for Sustainable Agriculture and Rural Development” which is jointly implemented by Baraka Agricultural College in Kenya and CINOP Global in the Netherlands.

I am convinced that these occupational standards will go a long way in ensuring that workers in Agriculture Sector acquire competencies that will enable them to perform their work more efficiently.

CHAIRPERSON,

SECTOR SKILL ADVISSORY COMMITTEE

Contents

[FOREWORD iii](#_Toc29907730)

[PREFACE iv](#_Toc29907731)

[ACKNOWLEDGMENT v](#_Toc29907732)

[ACRONYMS i](#_Toc29907733)

[KEY TO UNIT CODE 1](#_Toc29907734)

[OVERVIEW 2](#_Toc29907735)

[BASIC UNITS OF COMPETENCY 3](#_Toc29907736)

[DEMONSTRATE COMMUNICATION SKILLS 4](#_Toc29907737)

[DEMONSTRATE NUMERACY SKILLS 8](#_Toc29907738)

[DEMONSTRATE DIGITAL LITERACY 14](#_Toc29907739)

[DEMONSTRATE ENTREPRENEURIAL SKILLS 19](#_Toc29907740)

[DEMONSTRATE EMPLOYABILITY SKILLS 28](#_Toc29907741)

[DEMONSTRATE ENVIRONMENTAL LITERACY 37](#_Toc29907742)

[DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES 45](#_Toc29907743)

[CORE UNITS OF COMPETENCY 51](#_Toc29907744)

[DEMONSTRATE BEE BIOLOGY AND BEHAVIOR 52](#_Toc29907745)

[ESTABLISH AN APIARY 57](#_Toc29907746)

[CONSTRUCT BEE HIVES AND BEE EQUIPMENT 62](#_Toc29907747)

[MANAGE BEE FACILITIES, TOOLS AND EQUIPMENT 66](#_Toc29907748)

[MANAGE BEE FORAGE RESOURCES 71](#_Toc29907749)

[MANAGE HONEY BEE SWARMS 76](#_Toc29907750)

[MANAGE HONEY BEE COLONY 80](#_Toc29907751)

[CONTROL HONEY BEE PESTS AND DISEASES 86](#_Toc29907752)

[HARVEST BEE PRODUCTS 90](#_Toc29907753)

[PROCESS BEE PRODUCTS 94](#_Toc29907754)

[MANAGE QUALITY OF BEE PRODUCTS 98](#_Toc29907755)

[PERFORM BEE PRODUCT VALUE ADDITION 103](#_Toc29907756)

[APPLY BEE MICROSCOPIC TECHNIQUES 107](#_Toc29907757)

[CONDUCT RESEARCH IN BEE KEEPING 110](#_Toc29907758)

[PROVIDE BEE KEEPING TRAINING AND EXTENSION SERVICES 115](#_Toc29907759)

# **ACRONYMS** AND ABBREVIATIONS

BC Basic Competency

CDACC Curriculum Development Assessment and Certification Council

CC Core Competency

CO Common Units

CU Curriculum

KCSE Kenya Certificate of Secondary Education

KNQA Kenya National Qualifications Authority

OSHA Occupation Safety and Health Act

PPE Personal Protective Equipment

SSAC Sector Skills Advisory Committee

TVET Technical and Vocational Education and Training

# KEY TO UNIT CODE



# OVERVIEW

**Description**

The **Apiculture management level six qualification** consists of competencies that a person must achieve to demonstrate bee biology and behaviour, establish an apiary, construct bee hives and bee equipment, manage bee facilities, tools and equipment, manage bee forage resources, manage honey bee swarms, manage honey bee colony, control honey bee pests and diseases, harvest bee products, process bee products, manage quality of bee products, perform bee product value addition, apply bee microscopic techniques, conduct research in bee keeping and provide bee keeping training and extension services within the institution’s/organizations acceptable standard operating procedures (SOPs).

**Units of Learning**

This course consists of basic, core competencies as indicated below:

**BASIC COMPETENCY**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| AGR/OS/API/BC/01/6/A | Demonstrate communication skills |
| AGR/OS/API/BC/02/6/A | Demonstrate Numeracy skills |
| AGR/OS/API/BC/03/6/A | Demonstrate digital literacy |
| AGR/OS/API/BC/04/6/A | Demonstrate entrepreneurial skills |
| AGR/OS/API/BC/05/6/A | Demonstrate employability skills |
| AGR/OS/API/BC/06/6/A | Demonstrate environmental literacy |
| AGR/OS/API/BC/07/6/A | Demonstrate occupational safety and health practices |

**CORE COMPETENCY**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| AGR/OS/API/BC/01/6/A | Demonstrate bee biology and behaviour |
| AGR/OS/API/BC/02/6/A | Establish an apiary |
| AGR/OS/API/BC/03/6/A | Construct bee hives and bee equipment |
| AGR/OS/API/BC/04/6/A | Manage bee facilities, tools and equipment |
| AGR/OS/API/BC/05/6/A | Manage bee forage resources |
| AGR/OS/API/BC/06/6/A | Manage honey bee swarms |
| AGR/OS/API/BC/07/6/A | Manage honey bee colony |
| AGR/OS/API/BC/08/6/A | Control honey bee pests and diseases |
| AGR/OS/API/BC/09/6/A | Harvest bee products |
| AGR/OS/API/BC/10/6/A | Process bee products |
| AGR/OS/API/BC/11/6/A | Manage quality of bee products |
| AGR/OS/API/BC/12/6/A | Perform bee product value addition |
| AGR/OS/API/BC/13/6/A | Apply bee microscopic techniques |
| AGR/OS/API/BC/14/6/A | Conduct research in bee keeping |
| AGR/OS/API/BC/15/6/A | Provide bee keeping training and extension services |

# BASIC UNITS OF COMPETENCY

# DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE: AGR/OS/API/BC/01/6/A**

**UNIT DESCRIPTION**

This unit covers the competencies required in meeting communication needs of clients and colleagues; developing, establishing, maintaining communication pathways and strategies. It also covers competencies for conducting interview, facilitating group discussion and representing the organization in various forums.

**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 | 1.1 Specific communication needs of clients and colleagues are identified and met  1.2 Different approaches are used to meet communication needs of clients and colleagues  1.3 Conflict is addressed promptly and in a timely way and in a manner, which does not compromise the standing of the organization |
| 1. Develop communication strategies | * 1. Strategies for effective internal and external dissemination of information are developed to meet the organization’s requirements   2. Special communication needs are considered in developing strategies to avoid discrimination in the workplace   3. Communication ***strategies*** are analyzed, evaluated and revised where necessary to make sure they are effective |
| 1. Establish and maintain communication pathways | * 1. Pathways of communication are established to meet requirements of organization and workforce   2. Pathways are maintained and reviewed to ensure personnel are informed of relevant information |
| 1. Promote use of communication strategies | * 1. Information is provided to all areas of the organization to facilitate implementation of the strategy   2. Effective communication techniques are articulated and modelled to the workforce   3. Personnel are given guidance about adapting communication strategies to suit a range of contexts |
| 1. Conduct interview | 1. A range of appropriate communication strategies are employed in ***interview situations*** 2. Records of interviews are made and maintained in accordance with organizational procedures 3. Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated |
| 1. Facilitate group discussion | * 1. Mechanisms which enhance ***effective group interaction*** is defined and implemented   2. Strategies which encourage all group members to participate are used routinely   3. Objectives and agenda for meetings and discussions are routinely set and followed   4. Relevant information is provided to group to facilitate outcomes   5. Evaluation of group communication strategies is undertaken to promote participation of all parties   6. Specific communication needs of individuals are identified and addressed |
| 1. Represent the organization | 7.1 When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization  7.2 Presentation is clear and sequential and delivered within a predetermined time  7.3 Appropriate media is utilized to enhance presentation  7.4 Differences in views are respected  7.5 Written communication is consistent with organizational standards  7.6 Inquiries are responded in a manner consistent with 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** |
| Communication ***strategies***  include but not limited to: | * Language switch * Comprehension check * Repetition * Asking confirmation * Paraphrase * Clarification request * Translation * Restructuring * Approximation * Generalization |
| ***Effective group interaction*** includes 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 |
| ***Situations*** 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:

* Effective communication
* Active listening
* Giving/receiving feedback
* Interpretation of information
* Role boundaries setting
* Negotiation
* Establishing empathy
* Openness and flexibility in communication
* Communication skills required to fulfill job roles as specified by the organization
* Writing communications strategy
* Applying key elements of communications strategy

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Communication process
* Dynamics of groups and different styles of group leadership
* Communication skills relevant to client groups
* Flexibility in communication
* Communication skills relevant to client groups

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/Demonstration with Oral Questioning 2. Written Examination |
| 1. Context of Assessment | Competency may be assessed individually in the actual workplace or through accredited institution |
| 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: AGR/OS/API/BC/02/6/A**

**UNIT DESCRIPTION**

This unit describes the competencies required by a worker in order to apply a wide range of mathematical calculations for work; apply ratios, rates and proportions to solve problems; estimate, measure and calculate measurement for work; Use detailed maps to plan travel routes for work; Use geometry to draw and construct 2D and 3D shapes for work; Collect, organize and interpret statistical data; Use routine formula and algebraic expressions for work and use 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 | 1.1 Mathematical information embedded in a range of workplace tasks and texts is extracted  1.2 Mathematical information is interpreted and comprehended  1.3 A range of mathematical and problem-solving processes are select and used  1.4 Different forms of fractions, decimals and percentages are flexibly used  1.5 Calculation performed with positive and negative numbers  1.6 Numbers are expressed as powers and roots and are used in calculations  1.7 Calculations done using routine formulas  1.8 Estimation and assessment processes are used to check outcome  1.9 Mathematical language is used to discuss and explain the processes, results and implications of the task |
| 2. Use and apply ratios, rates and proportions for work | 2.1 Information regarding ratios, rates and proportions extracted from a range of workplace tasks and texts  2.2 Mathematical information related to ratios, rate and proportions is analyzed  2.3 Problem solving processes are used to undertake the task  2.4 Equivalent ratios and rates are simplified  2.5 Quantities are calculated using ratios, rates and proportions  2.6 Graphs, charts or tables are constructed to represent ratios, rates and proportions  2.6 The outcomes reviewed and checked  2.7 Information is record using mathematical language and symbols |
| 3. Estimate, measure and calculate measurement for work | 1. Measurement information embedded in workplace texts and tasks are extracted and interpreted 2. Appropriate workplace measuring equipment are identified and selected 3. Accurate measurements are estimate and made 4. The area of 2D shapes including compound shapes are calculated 5. The volume of 3D shapes is calculated using relevant formulas 6. Sides of right angled triangles are calculated using Pythagoras’ theorem 7. conversions are performed between units of measurement 8. Problem solving processes are used to undertake the task 9. The measurement outcomes are reviewed and checked 10. Information is recorded using mathematical language and symbols appropriate for the task |
| 4. Use detailed maps to plan travel routes for work | 4.1 Different types of maps are identified and interpreted  4.2 Key features of maps are identified  4.3 Scales are identified and interpreted  4.4 Scales are applied to calculate actual distances  4.5 Positions or locations are determined using directional information  4.6 Routes are planned by determining directions and calculating distances, speeds and times  4.7 Information is gathered and identified, and relevant factors related to planning a route checked  4.8 Relevant equipment is select and checked for accuracy and operational effectiveness  4.9 Task is planned and recorded using specialized mathematical language and symbols appropriate for the task |
| 5. Use geometry to draw 2D shapes and construct 3D shapes for work | 5.1 A range of 2D shapes and 3D shapes and their uses in work contexts is identified  5.2 Features of 2D and 3D shapes are named and described  5.3 Types of angles in 2D and 3D shapes are identified  5.4 Angles are drawn, estimated and measured using geometric instruments  5.5 Angle properties of 2D shapes are named and identified  5.6 Angle properties are used to evaluate unknown angles in shapes  5.7 Properties of perpendicular and parallel lines are applied to shapes  5.8 Understanding and use of symmetry is demonstrated  5.9 Understanding and use of similarity is demonstrated  5.10 The workplace tasks and mathematical processes required are identified  5.11 2D shapes is drawn for work  5.12 3D shapes is constructed for work  5.13 The outcomes are reviewed and checked  5.14 Specialized mathematical language and symbols appropriate for the task are used |
| 6. Collect, organize, and interpret statistical data for work | 6.1 Workplace issue requiring investigation are identified  6.2 Audience / population / sample unit is determined  6.3 Data to be collected is identified  6.4 Data collection method is selected  6.5 Appropriate statistical data is collected and organized  6.6 Data is illustrated in appropriate formats  6.7 The effectiveness of different types of graphs are compared  6.8 The summary statistics for collected data is calculated  6.9 The results / findings are interpreted  6.10 Data is checked to ensure that it meets the expected results and content  6.11 Information from the results including tables, graphs and summary statistics is extracted and interpreted  6.12 Mathematical language and symbols are used to report results of investigation |
| 7. Use routine formula and algebraic expressions for work | 7.1 Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated  7.2 Simple algebraic expressions and equations are developed  7.3 Operate on algebraic expressions  7.4 Algebraic expressions are simplified  7.5 Substitution into simple routine equations is done  7.6 Routine formulas used for work tasks are identified and comprehended  7.7 Routine formulas are evaluate by substitution  7.8 Routine formulas transposed  7.9 Appropriate formulas are identified and used for work related tasks  7.10Outcomes are checked and result of calculation used |
| 8. Use common functions of a scientific calculator for work | 8.1 Required numerical information to perform tasks is located  8.2 The order of operations and function keys necessary to solve mathematical calculation are determined  8.3 Function keys on a scientific calculator are identified and used  8.4 Estimations are referred to check reasonableness of problem-solving process  8.5 Appropriate mathematical language, symbols and conventions are used to report results |

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. Geometry | May include but not limited to:   1. Scale drawing 2. Triangles 3. Simple solid 4. Round 5. Square 6. Rectangular 7. Triangle 8. Sphere 9. Cylinder 10. Cube 11. Polygons 12. Cuboids |

**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:

* Applying Fundamental operations (addition, subtraction, division, multiplication)
* Using calculator
* Using different measuring tools

**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. Performed calculations with positive and negative numbers   2. Used numbers expressed as powers and roots in calculations   3. Simplified ratios and rates   4. Constructed graphs, charts or tables to represent ratios, rates and proportions   5. Calculate the volume of 3D shapes using relevant formulas   6. Calculated sides of right-angle triangles using Pythagoras’ theorem   7. Applied scales in calculation of actual distances   8. Planned routes by determining directions, distance calculation, speeds and time.   9. Identified types of angles in 2D and 3D shapes   10. Used angle properties in evaluating unknown angles   11. Applied properties of perpendicular and parallel lines in shapes construction.   12. Collected and organized appropriate statistical data   13. Collected and organized appropriate statistical data   14. Identified and used appropriate formulas for work related tasks   15. Identified and used function keys on a scientific calculator |
| 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. Demonstration with Oral Questioning   3. Written Examination |
| 1. Context of Assessment | Competency may be assessed individually in the actual workplace or  through accredited institution |
| 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: AGR/OS/API/BC/03/6/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to effectively use digital devices such as smartphones, tablets, laptops and desktop PCs. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop PCs for purposes of communication, work performance and management at the work place.

**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.   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   2. ***Word processing utilities*** are applied in accordance with workplace procedures   3. Worksheet layout is prepared in accordance with work procedures   4. Worksheet is build 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** |
| ***Appropriate computer software*** may include but not limited to: | A collection of instructions or computer tools that enable the user to interact with a computer, its hardware, or perform tasks. |
| ***Appropriate computer hardware*** may include but not limited to: | Collection of physical parts of a computer system such as;   1. Computer case, monitor, keyboard, and mouse 2. All the parts inside the computer case, such as the hard disk drive, motherboard and video card |
| ***Data security and privacy*** may include but not limited to: | 1. Confidentiality of data 2. Cloud computing 3. Integrity -but-curious data surfing |
| ***Security and control measures*** may include but not limited to: | 1. Counter measures against cyber terrorism 2. Risk reduction 3. Cyber threat issues 4. Risk management 5. Pass-wording |
| ***Security threats*** may include but not limited to: | 1. Cyber terrorism 2. Hacking |
| ***Word processing concepts*** may include but not limited to: | Using a special program to create, edit and print documents |
| ***Network configuration*** may include but not limited to: | Organizing and maintaining information on the components of a computer network |

**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:

1. Analytical skills
2. Interpretation
3. Typing
4. Communication
5. Computing (applying fundamental operations such as addition, subtraction, division and multiplication)
6. Using calculator
7. Basic ICT skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

1. Software concept
2. Functions of computer software and hardware
3. Data security and privacy
4. Computer security threats and control measures
5. Technology underlying cyber-attacks and networks
6. Cyber terrorism
7. Computer crimes
8. Detection and protection of computer crimes
9. Laws governing protection of ICT
10. Word processing;
11. Functions and concepts of word processing.
12. Documents and tables creation and manipulations
13. Mail merging
14. Word processing utilities
15. Spread sheets;
16. Meaning, formulae, function and charts, uses and layout
17. Data formulation, manipulation and application to cells
18. Database;
19. Database design, data manipulation, sorting, indexing, storage retrieval and security
20. Desktop publishing;
21. Designing and developing desktop publishing tools
22. Manipulation of desktop publishing tools
23. Enhancement of typeset work and printing documents
24. Presentation Packages;
25. Types of presentation Packages
26. Creating, formulating, running, editing, printing and presenting slides and handouts
27. Networking and Internet;
28. Computer networking and internet.
29. Electronic mail and world wide web
30. Emerging trends and issues in ICT;
31. Identify and integrate emerging trends and issues in ICT
32. 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 | * 1. Tablets   2. Laptops and   3. Desktop PCs   4. Desktop computer   5. Lap top   6. Calculator   7. Internet   8. Smart phone   9. Operations Manuals |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written Test   2. Demonstration   3. Practical assignment   4. Interview/Oral Questioning   5. Demonstration |
| 1. Context of Assessment | Competency may be assessed in an off and on the job setting |
| 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: AGR/OS/API/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. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

**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. 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**  include but not limited to: |
| --- | --- |
| 1. Types of entrepreneurs but not limited to: | 1. Innovators 2. Imitators 3. Craft 4. Opportunistic 5. Speculators |
| 1. Principles of Entrepreneurship but not limited to: | 1. Visionary 2. Solution provider 3. Accountability 4. Growth and marketing 5. Resilient 6. Tenacious |
| 1. Characteristics of Entrepreneurs include but not limited to: | 1. Creative 2. Innovative 3. Planner 4. Risk taker 5. Networker 6. Confident 7. Flexible 8. Persistent 9. Patient 10. Independent 11. Future oriented 12. Goal oriented |
| 1. Requirements for entry into self-employment | 1. Technical skills 2. Management skills 3. Entrepreneurial skills 4. Resources 5. Infrastructure |
| 1. Internal motivation include but not limited to: | 1. Interest 2. Passion 3. Freedom 4. Prestige |
| 1. Business environment | 1. External 2. Internal 3. Intermediate |
| 1. Forms of businesses | 1. Sole proprietorship 2. Partnership 3. Limited companies 4. Cooperatives |
| 1. Governing policies | 1. Increasing scope for finance 2. Promoting cooperation between entrepreneurs and private sector 3. Reducing regulatory burden on entrepreneurs 4. Developing IT tools for entrepreneurs |
| 1. External motivation include but not limited to: | 1. Rewards 2. Punishment 3. Enabling environment 4. Government policies |
| 1. Entrepreneurial orientation include but not limited to: | 1. Passion 2. Interest 3. Hobbies 4. Skills |
| 1. Innovative business strategies include but not limited to: | 1. New products 2. New methods of production 3. New markets 4. New sources of supplies 5. Change in industrialization |
| 1. Communication principles include but not limited to: | 1. Feed back 2. Attention 3. Clarity 4. Timeliness 5. Adequacy 6. Consistency 7. Informality |
| 1. Motivational theories include but not limited to: | 1. Marslows theory 2. McClelland theory 3. Fredrick Tylors theory |

**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:

* Assessing a range of alternative products and strategies
* Critically analyzing information, summarizing and making sense of previous and current market trends
* Identifying changing consumer preferences and demographics
* Thinking “outside the box”
* Ensuring quality consistency
* Reducing lead time to product/service delivery
* Management
* Using formal problem-solving procedures, e. g., root-cause analysis, six sigmas
* Communication
* Applying motivational principles, e. g., positive stroking, behavior modification
* Assessing range of alternatives rather than choosing the easiest option
* Achieving ownership and credibility for the enterprise vision
* Critically analyzing information, summarizing and making sense of previous and current market trends
* Developing solutions and practical strategies which are “outside the box”

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Entrepreneurial competencies
* Decision making
* Business communication
* Change management
* Coping with competition
* Risk taking
* 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
* Concepts of change management
* Relevant developments in other industries
* Regional/ County business expansion strategies
* Innovation in business

**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. Distinguished entrepreneurs and business persons correctly 2. Identified ways of becoming an entrepreneur appropriately 3. Explored factors affecting entrepreneurship development appropriately 4. Analysed importance of self-employment accurately 5. Identified requirements for entry into self-employment correctly 6. Identified sources of business ideas correctly 7. GeneratedBusiness ideas and opportunities correctly 8. Analysed business life cycle accurately 9. Identified legal aspects of business correctly 10. Assessed product demand accurately 11. Determined Internal and external motivation factors appropriately 12. Carried out communications effectively 13. Identified sources of business finance correctly 14. Determined Governing policy on small scale enterprise appropriately 15. Explored problems of starting and operating SSEs effectively 16. Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly 17. Prepared executive summary correctly 18. Determined business innovative strategies appropriately 19. Presented business plan effectively |
| 1. Resource Implications | The following resources should be provided:   1. Check list 2. Research tools (Questionnaire, interview guide, observation schedule) 3. Materials, tools, equipment and machines relevant |
| 1. Methods of Assessment | 1. Written tests 2. Observation 3. Oral questions 4. Third party report 5. Interviews 6. Case problems 7. Portfolio |
| 1. Context of Assessment | 1. Competency may be assessed in workplace or in a simulated workplace setting 2. Assessment shall be observed while tasks are being undertaken whether individually or in-group |
| 5. 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: AGR/OS/API/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. Emotions are managed 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. 6. Self-esteem and a positive self-image are developed and maintained. 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 as per ***personal objectives*** 10. Critics are managed as per personal objectives |
| 1. Demonstrate interpersonal communication | 1. Listening and understanding is demonstrated as per communication policy 2. Writing to the needs of the audience is demonstrated as per communication policy 3. Speaking, reading and writing is demonstrated as per communication policy 4. Negotiation skills are demonstrated as per communication policy 5. Empathizing is demonstrated as per the communication policy 6. Numeracy is applied as per the communication policy 7. Internal and external customers’ needs are identified and interpreted as per the communication policy 8. Persuasion is demonstrated as per the communication policy 9. Communication nnetworks are established as per the SOPs 10. Information is shared as per communication structure |
| 1. Demonstrate critical safe work habits | * 1. Stress is managed in accordance with workplace procedures.   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 procedures.   6. Leisure time is recognized in line with organization policy.   7. Abstinence from ***drug and substance abuse*** is observed as per workplace policy.   8. Awareness of HIV and AIDS is demonstrated in line with workplace requirements.   9. Safety consciousness is demonstrated in the workplace based on organization safety policy.   10. ***Emerging issues*** are dealt with in accordance with organization policy. |
| 1. Lead a workplace team | 1. Performance expectations for the ***team*** are set 2. Duties and responsibilities are assigned in accordance with the organization policy. 3. Team parameters and ***relationships*** are identified according to set rules and regulations. 4. ***Forms of communication*** in a team are established according to office policy. 5. Communication is carried out as per workplace place policy and requirements of the job. 6. Team performance is supervised 7. ***Feedback*** on performance is collected and analyzed based on established team learning process 8. Conflicts are resolved between team members in line with organization rules and regulations. 9. ***Gender mainstreaming*** is undertaken in accordance with set regulations. 10. Human rights are adhered to in accordance with existing protocol. 11. Healthy relationships are developed and maintained for harmonious co-existence in line with workplace. |
| 1. Plan and organize work | 1. Task requirements are identified as per the workplace objectives 2. Task is interpreted in accordance with safety (OHS ), environmental requirements and quality requirements 3. Work activity is organized with other involved personnel as per the SOPs 4. Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5. Work activities are monitored and evaluated in line with organization procedures. 6. Job planning is documented in accordance with workplace requirements. 7. Planning and organizing of work activities is reviewed as per the workplace requirements 8. Time is managed achieve workplace set goals and objectives. |
| 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 availed based on job requirements.   3. Resources for training are mobilized and allocated based organizations skills needs.   4. Licensees and certifications relevant to job and career are obtained and renewed.   5. ***Personal growth*** is pursued towards improving the qualifications set for the profession.   6. Work priorities and commitments are managed based on requirement of the job and workplace policy.   7. Recognitions are sought as proof of career advancement in line with professional requirements. |
| 1. Demonstrate workplace learning | * 1. Own learning is managed as per workplace policy.   2. Learning opportunities are sought and allocated based on job requirement and in line with organization policy.   3. Contribution to the learning community at the workplace is carried out.   4. ***Range of media for learning*** are established as per the training need   5. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job   6. Enthusiasm for ongoing learning is demonstrated   7. Time and effort is invested in learning new skills-based job requirements   8. Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace.   9. Awareness of Occupational Health and Safety procedures are demonstrated in use of technology in the workplace.   10. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.   11. New systems are developed and maintained in accordance with the requirements of the job.   12. Opportunities that are not obvious are identified and exploited in line with organization objectives.   13. Opportunities for performance improvement are identified proactively in area of work.   14. Awareness of personal role in workplace ***innovation*** is demonstrated. |
| 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.   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 workplace ethics | * 1. Policies and guidelines are observed as per the workplace requirements   2. Self-worth and profession is exercised in line with personal goals and organizational policies   3. Code of conduct is observed as per the workplace requirements   4. Personal and professional integrity is demonstrated as per the personal goals   5. Commitment to jurisdictional laws is demonstrated as per the workplace requirements |

**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.

|  |  |
| --- | --- |
| **Range** | **Variable** |
| ***Drug and substance abuse*** include but not limited to: | Commonly abused   1. Alcohol 2. Tobacco 3. Miraa 4. Over-the-counter drugs 5. Cocaine 6. Bhang 7. Glue |
| ***Feedback*** includes but not limited to: | 1. Verbal 2. Written 3. Informal 4. Formal |
| ***Relationships*** includes but not limited to: | 1. Man/Woman 2. Trainer/trainee 3. Employee/employer 4. Client/service provider 5. Husband/wife 6. Boy/girl 7. Parent/child 8. Sibling relationships |
| ***Forms of communication*** include but not limited to: | 1. Written 2. Visual 3. Verbal 4. Non verbal 5. Formal and informal |
| ***Team*** includes but not limited to: | 1. Small work group 2. Staff in a section/department 3. Inter-agency group |
| ***Personal growth*** includes but not limited to: | |  | | --- | | 1. Growth in the job 2. Career mobility 3. Gains and exposure the job gives 4. Net workings 5. Benefits that accrue to the individual as a result of noteworthy performance | |
| ***Personal objectives*** include but not limited to: | 1. Long term 2. Short term 3. Broad 4. Specific |
| ***Trainings and career opportunities*** includes but not limited to | 1. Participation in training programs 2. Technical 3. Supervisory 4. Managerial 5. Continuing Education 6. Serving as Resource Persons in conferences and workshops |
| ***Resource*** include but not limited to: | 1. Human 2. Financial 3. Technology 4. Hardware 5. Software |
| ***Innovation*** include but not limited to: | 1. New ideas 2. Original ideas 3. Different ideas 4. Methods/procedures 5. Processes 6. New tools |
| ***Emerging issues*** include but not limited to: | 1. Terrorism 2. Social media 3. National cohesion 4. Open offices |
| ***Range of media for learning*** include but not limited to: | 1. Mentoring 2. peer support and networking 3. 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:

1. Personal hygiene practices
2. Intra and Interpersonal skills
3. Communication skills
4. Knowledge management
5. Interpersonal skills
6. Critical thinking skills
7. Observation skills
8. Organizing skills
9. Negotiation skills
10. Monitoring skills
11. Evaluation skills
12. Record keeping skills
13. Problem solving skills
14. Decision Making skills
15. Resource utilization skills
16. Resource mobilization skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

1. Work values and ethics
2. Company policies
3. Company operations, procedures and standards
4. Occupational Health and safety procedures
5. Fundamental rights at work
6. Personal hygiene practices
7. Workplace communication
8. Concept of time
9. Time management
10. Decision making
11. Types of resources
12. Work planning
13. Resources and allocating resources
14. Organizing work
15. Monitoring and evaluation
16. Record keeping
17. Workplace problems and how to deal with them
18. Negotiation
19. Assertiveness
20. Team work
21. Gender mainstreaming
22. HIV and AIDS
23. Drug and substance abuse
24. Leadership
25. Safe work habits
26. Professional growth and development
27. Technology in the workplace
28. Learning
29. Creativity
30. Innovation
31. Emerging issues
    1. Social media
    2. Terrorism
    3. National cohesion

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 ethical performance |
| 1. Resource Implications | |  | | --- | | The following resources should be provided: |  * 1. Case studies/scenarios |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Oral Interview 2. Observation 3. Third Party Reports 4. Written |
| 1. Context of Assessment | * 1. Competency may be assessed in workplace or in a simulated workplace setting   2. Assessment shall be observed while tasks are being undertaken whether individually or in-group |
| 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: AGR/OS/API/BC/06/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to follow procedures for environmental hazard control, follow procedures for environmental pollution control, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, develop and adhere to environmental protection principles/strategies/guidelines, analyze resource use, develop resource conservation plans and implement selected 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 | 1.1 ***Storage methods*** for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS.  1.2 ***Disposal methods*** of hazardous wastes are followed at all times according to environmental regulations and OSHS.  1.3 ***PPE*** is used according to OSHS. |
| 1. Control environmental Pollution control | * 1. Environmental pollution ***control measures*** are compiled following standard protocol.   2. Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999   3. Methods for minimizing ***noise pollution*** complied following environmental regulations. |
| 1. Demonstrate sustainable resource use | * 1. Methods for minimizing wastage are complied with.   2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)   3. Methods for economizing or reducing resource consumption are practiced. |
| 1. Evaluate current practices in relation to resource usage | * 1. Information on resource efficiency systems and procedures are collected and provided to the work group where appropriate.   2. Current resource usage is measured and recorded by members of the 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 | 5.1 Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact  5.2 Industrial standard/environmental practices are described according to the different environmental concerns |
| 1. Implement specific environmental programs | 6.1 Programs/Activities are identified according to organizations policies and guidelines.  6.2 Individual roles/responsibilities are determined and performed based on the activities identified.  6.3 Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines  6.4 Stakeholders are consulted based on company guidelines |
| 1. Monitor activities on Environmental protection/Programs | 7.1 Activities are periodically monitored and Evaluated according to the objectives of the environmental program  7.2 Feedback from stakeholders are gathered and considered in Proposing enhancements to the program based on consultations  7.3 Data gathered are analyzed based on Evaluation requirements  7.4 Recommendations are submitted based on the findings  7.5 Management support systems are set/established to sustain and enhance the program  7.6 Environmental incidents are monitored and reported to  concerned/proper authorities |
| 1. Analyze resource use | 8.1. All resource consuming processes are Identified  8.2. Quantity and nature of Resource consumed is determined  8.3. Resource flow is analyzed through different parts of the process.  8.4. Wastes are classified for possible source of resources. |
| 1. Develop resource Conservation plans | 9.1. Efficiency of use/conversion of resources is determined following 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** |
| ***PPE*** May include but are not limited to | 1.1 Mask  1.2 Gloves  1.3 Goggles  1.4 Safety hat  1.5 Overall  1.6 Hearing protector |
| ***Environmental pollution control measures*** may include but are not limited to: | 2.1 Methods for minimizing or stopping spread and ingestion of airborne particles  2.2 Methods for minimizing or stopping spread and ingestion of gases and fumes  2.4 Methods for minimizing or stopping spread and ingestion of liquid wastes |
| ***Wastes*** may include but are not limited to: | 3.1 Unnecessary waste  3.2 Necessary waste |
| ***Waste management Procedures*** may include but are not limited to: | 4.1 Sorting  4.2 Storing of items  4.2 Recycling of items  4.3 Disposal of items |
| ***Resources*** may include but are not limited to: | 5.1 Electric  5.2 Water  5.3 Fuel  5.4 Telecommunications  5.5 Supplies  5.6 Materials |
| ***Workplace environmental hazards*** may include but are not limited to: | 6.1Biological hazards  6.2 Chemical and dust hazards  6.3 Physical hazards |
| ***Organizational systems and procedures*** may include but are not limited to: | 7.1 Supply chain, procurement and purchasing  7.2 Quality assurance  7.3 Making recommendations and seeking approvals |
| ***Legislations/Conventions*** may include but are not limited to: | 8.1 EMCA 1999  8.2 Montreal Protocol  8.3 Kyoto Protocol |
| ***Environmental aspects/impacts*** may include but are not limited to: | 9.1 Air pollution  9.2 Water pollution  9.3 Noise pollution  9.4 Solid waste  9.5 Flood control  9.6 Deforestation/Denudation  9.7 Radiation/Nuclear /Radio Frequency/ Microwaves  9.8 Situation  9.9 Soil erosion (e.g. Quarrying, Mining, etc.)  9.10 Coral reef/marine life protection |
| ***Industrial standards / Environmental practices*** may include but are not limited to: | 10.1 ISO standards  10.2 Company environmental management systems  (EMS) |
| ***Periodic*** may include but are not limited to: | 11.1 hourly  11.2 daily  11.3 weekly  11.4 monthly  11.5 quarterly  11.6 yearly |
| ***Programs/Activities*** may include but are not limited to: | 12.1 Waste disposal (on-site and off-site)  12.2 Repair and maintenance of equipment  12.3 Treatment and disposal operations  12.4 Clean-up activities  12.5 Laboratory and analytical test  12.6 Monitoring and evaluation  12.7 Environmental advocacy programs |

**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:

* Following storage methods of environmentally hazardous materials
* Following disposal methods of hazardous wastes
* Using PPE
* Practicing OSHS
* Complying environmental pollution control
* Observing solid waste management
* Complying methods of minimizing noise Pollution
* Complying methods of minimizing wastage
* Employing waste management procedures
* Economizing resource consumption
* Listing of resources used
* Measuring current usage of resources
* Identifying and reporting workplace environmental hazards
* Conveying all environmental issues
* Following environmental regulations
* Identifying environmental regulations
* Assessing procedures for assessing compliance
* Collecting information on environmental and resource efficiency systems and procedures, and Providing information to the work group
* Measuring and recording current resource usage
* Analysing and recording current purchasing strategies.
* Analysing current work processes to access information and data and Assisting identifying areas for improvement
* Analysing resource flow
* Determining efficiency of use/conversion of resources
* Determining causes of low efficiency of use
* Developing plans for increasing the efficiency of resource use
* Checking resource use plans
* Complying to regulations/licensing requirements
* Determining benefit/cost of plans
* Ranking proposals based on benefit/cost compared to limited resources
* Checking proposals meet regulatory requirements
* Monitoring implementation
* Making adjustments to plan and implementation
* checking new resource usage

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Storage methods of environmentally hazardous materials
* Disposal methods of hazardous wastes
* Usage of PPE Environmental regulations
* OSHS
* Types of pollution
* Environmental pollution control measures
* Different solid wastes
* Solid waste management
* Different noise pollution
* Methods of minimizing noise pollution
* Methods of minimizing wstage
* Waste management procedures
* Economizing of resource consumption
* Principle of 3Rs
* Types of resources
* Techniques in measuring current usage of resources
* Calculating current usage of resources
* Types of workplace environmental hazards
* Environmental regulations
* Environmental regulations applying to the enterprise.
* Procedures for assessing compliance with environmental regulations.
* Collection of information on environmental and resource efficiency systems and procedures,
* Measurement and recording of current resource usage
* Analysis and recording of current purchasing strategies.
* Analysis current work processes to access information and data Analysis of data and information
* Identification of areas for improvement
* Resource consuming processes
* Determination of quantity and nature of resource consumed
* Analysis of resource flow of different parts of the resource flow process
* Use/conversion of resources
* Causes of low efficiency of use
* Increasing the efficiency of resource use
* Inspection of resource use plans
* Regulations/licensing requirements
* Determine benefit/cost for alternative resource sources
* Benefit/costs for different alternatives
* Components of proposals
* Criteria on ranking proposals
* Regulatory requirements
* Proposals for improving resource efficiency
* Implementation of resource efficiency plans
* Procedures in monitor implementation
* Adjustments of implementation plan
* Inspection of new resource usage

**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 localordinances 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. Demonstration   2. Oral questioning   3. Written examination   4. Interview/Third Party Reports   5. Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad)   6. Simulations and role-play |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment. |
| 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: AGR/OS/API/BC/07/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to lead the implementation of workplace’s safety and health program, 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 and/or its ***indicators*** of its presence, are identified  1.2 ***Evaluation and/or work environment*** measurements of OSH hazards/risk existing in the workplace is conducted by  Authorized personnel or agency  1.3 ***OSH issues and/or concerns*** raised by workers are  Gathered |
| 1. Identify and implement appropriate control measures | 2.1 Prevention ***and control measures***, including use of  s***afety gears / PPE (personal protective equipment)*** for specific hazards  identified and implemented  2.2 ***Appropriate risk controls*** based on result of OSH hazard evaluation is recommended.  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, procedures and policies/ guidelines | 3.1 Information to work team about company OSH program, procedures and policies/guidelines are provided  3.2 Implementation of OSH procedures and policies/ guidelines are participated  3.3 Team members are trained and advised on OSH standards and procedures  3.4 Procedures for maintaining ***OSH-related records*** are implemented |

**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 are not limited to: | 1.1. Physical hazards – impact, illumination, pressure, noise,  vibration, extreme temperature, radiation  1.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects  1.3 Chemical hazards – dusts, fibers, mists, fumes, smoke,  gasses, vapors  1.4 Ergonomics  Psychological factors – over exertion/ excessive force,  awkward/static positions, fatigue, direct pressure,  varying metabolic cycles  Physiological factors – monotony, personal  relationship, work out cycle  1.6 Safety hazards (unsafe workplace condition) –  confined space, excavations, falling objects, gas  leaks, electrical, poor storage of materials and  waste, spillage, waste and debris  1.7 Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work) |
| 1. ***Indicators may include*** but are not limited to: | 2.1 Increased of incidents of accidents, injuries  2.2 Increased occurrence of sickness or health complaints/ symptoms  2.3 Common complaints of workers related to OSH  2.4 High absenteeism for work-related reasons |
| 1. ***Evaluation and/or work environment measurements*** may include but are not limited to: | 3.1 Health Audit  3.2 Safety Audit  3.3 Work Safety and Health Evaluation  3.4 Work Environment Measurements of Physical and Chemical  Hazards |
| 1. ***OSH issues and/or concerns*** may include but are not limited to: | 4.1 Workers’ experience/observance on presence of work hazards  4.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)  4.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines |
| 1. ***Prevention and control measures*** may include but are not limited to: | 5.1 Eliminate the hazard (i.e., get rid of the dangerous machine  5.2 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off)  5.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)  5.4 Use administrative controls to reduce the risk (i.e. give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule)  5.5 Use engineering controls to reduce the risk (i.e. use safety guards to machine)  5.6 Use personal protective equipment  5.7 Safety, Health and Work Environment Evaluation  5.8 Periodic and/or special medical examinations of workers |
| 1. ***Safety gears /PPE (Personal Protective Equipments)*** may include but are not limited to: | 6.1 Arm/Hand guard, gloves  6.2 Eye protection (goggles, shield)  6.3 Hearing protection (ear muffs, ear plugs)  6.4 Hair Net/cap/bonnet  6.5 Hard hat  6.6 Face protection (mask, shield)  6.7 Apron/Gown/coverall/jump suit  6.8 Anti-static suits   * 1. High-visibility reflective vest |
| 1. ***Appropriate risk controls*** | Appropriate risk controls in order of impact are as follows:  7.1 Eliminate the hazard altogether (i.e., get rid of the dangerous machine)  7.2 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)  7.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)  7.4 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)  7.5 Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users)  7.6 Use personal protective equipment (i.e., wear  gloves and goggles when using the machine) |
| 1. ***Contingency measures*** may include but are not limited to: | 8.1 Evacuation  8.2 Isolation  8.3 Decontamination  8.4 (Calling designed) emergency personnel |
| 1. ***Emergency procedures*** may include but are not limited to: | 9.1 Fire drill  9.2 Earthquake drill  9.3 Basic life support/CPR  9.4 First aid  9.5 Spillage control  9.6 Decontamination of chemical and toxic  9.7 Disaster preparedness/management  9.8 se of fire-extinguisher |
| 1. ***Incidents and emergencies*** may include but are not limited to: | 10.1 Chemical spills  10.2 Equipment/vehicle accidents  10.3 Explosion  10.4 Fire  10.5 Gas leak  10.6 Injury to personnel  10.7 Structural collapse  10.8 Toxic and/or flammable vapors emission. |
| 1. ***OSH-related Records*** may include but are not limited to: | 11.1 Medical/Health records  11.2 Incident/accident reports  11.3 Sickness notifications/sick leave application  11.4 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:

* Skills on preliminary identification of workplace hazards/risks
* Knowledge management
* Critical thinking skills
* Observation skills
* Coordinating skills
* Communication skills
* Interpersonal skills
* Troubleshooting skills
* Presentation skills
* Training skills

**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. Identifies hazards/risks in the workplace and/or its indicators 2. Requests for evaluation and/or work environment measurements of OSH hazards/risk in the workplace 3. Gathers OSH issues and/or concerns raised by workers 4. Identifies and implements prevention and control measures, including use of PPE (personal protective equipment) for specific hazards 5. Recommends appropriate risk controls based on result of OSH hazard evaluation and OSH issues gathered 6. Establish contingency measures, including emergency procedures in accordance with organization procedures 7. Provides information to work team about company OSH program, procedures and policies/guidelines 8. Participates in the implementation of OSH procedures and policies/guidelines 9. Trains and advises team members on OSH standards and procedures 10. Implements procedures for maintaining OSH-related records |
| 1. Resource Implications | The following resources should be provided:  2.1 Workplace or assessment location  2.2 OSH personal records  2.3 PPE  2.4 Health records |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Portfolio Assessment  3.2 Interview  3.3 Case Study/Situation  3.4 Observation/Demonstration and oral questioning |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment. |
| 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

# DEMONSTRATE BEE BIOLOGY AND BEHAVIOR

**UNIT CODE: AGR/OS/API/CR/01/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate bee biology and behavior. It involves identifying bee species, demonstrating understanding of bee lifecycle and caste, demonstrating understanding of the physiological system of bees, determining bee nutrition and demonstrating the understanding of bee behavior.

**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 bee species | 1. ***Materials and equipment for identification*** are identified as per the taxonomic guidelines and standards. 2. Personal protective equipment is worn as per the occupational health and safety procedures. 3. ***Bee parts/external morphology*** are identified as per the workplace procedures. 4. Bee species and races are identified as per the taxonomic systems and procedures. |
| 1. Demonstrate understanding of bee lifecycle and caste | 1. Knowledge on ***Life cycle and caste*** demonstrated adequately as per |
| 1. Demonstrate understanding of the physiological system of bees | 1. Knowledge of ***physiological systems*** in bees is demonstrated adequately as per |
| 1. Determine bee nutrition | 1. Knowledge of bee nutrition is demonstrated adequately 2. ***Bee feed supplements/substitutes*** are formulated, packaged and stored appropriately |
| 1. Demonstrate the understanding of bee behavior | 1. ***Types of bee behavior*** are identified appropriately 2. Knowledge of ***factors affecting bee behavior*** is demonstrated adequately 3. Bee behavior is ***controlled*** based on the identified behavior 4. Methods of controlling bee behavior are applied 5. Understanding of bee behavior demonstrated |

**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.

|  |  |
| --- | --- |
| Variables | Range  may includes but not limited to: |
| 1. Materials and equipment for identification may includes but not limited to: | * Micro scopes * Hand lens * Dissecting kits * Taxonomic charts * Observation hive |
| 1. Bee parts/external morphology may include but not limited to: | * Wings * Legs * Antenna * Eyes * Thorax * Abdomen * Body hair * Color * Head |
| 1. Life cycle may include but not limited to: | * Egg * Larvae * Pupa * Adult |
| 1. Caste may include but not limited to: | * Queen bees * Drawn bees * Worker bees |
| 1. Physiological systems may include but not limited to: | * Reproductive, * Respiratory excretion * Digestive * Internal and external glandular systems |
| 1. Bee feed supplements/substitutes may include but not limited to: | * Honey * Sugar syrup * Corn syrup * Soya beans * Pollen supplements and substitutes * Carbohydrate supplements |
| 1. Types of bee behavior may include but not limited to: | * Swarming * Absconding * Migration * Scouting * Supercedure * Defensiveness * Communication * Fanning * Buzzing |
| 1. Factors affecting bee behavior may includes but not limited to: | * Physiological age and stage of development * Hormonal factors * Genetic make-up * Sounds * Chemical * Touch * Forage resources and nest sites * Environmental |
| 1. Controlled may includes but not limited to: | * Pest management * Colony division * Natural selection * Destroying swarm cells * Caging the queen * Clipping the wings * Identification and propagation of plants which flower throughout the year * Artificial feeding |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of bees
* Bee taxonomy parameters
* Types of PPE
* Lifecycle
* Caste system
* Physiological systems of bees
* Types of bee supplements and substitutes
* Formulation and packaging techniques
* Types of bee behavior
* factors affecting bee behavior
* methods of controlling bee behavior
* Bee behavior

**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 materials and equipment for species identification as per the taxonomic guidelines   2. Identified bee parts/external morphology as per the workplace procedures.   3. Identified bee species and races as per the taxonomic systems and procedures.   4. Demonstrated knowledge on Life cycle and caste adequately   5. Demonstrated knowledge of physiological systems in bees adequately   6. Demonstrated knowledge of bee nutrition adequately   7. Formulated, packaged and stored bee feed supplements/substitutes appropriately   8. Identified types of bee behavior appropriately   9. Demonstrated knowledge of factors affecting bee behavior adequately   10. Controlled bee behavior.   11. Applied methods of controlling bee behavior . |
| 1. Resource Implications for competence cetification | The following resources must be provided:  2.1 Access to relevant workplace where assessment can take place  2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# ESTABLISH AN APIARY

**UNIT CODE: AGR/OS/API/CR/02/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to establish an apiary. It involves selecting apiary site, clearing the apiary site, fencing apiary site, preparing bee hives, installing bee hives, constructing bee house and managing apiary facilities.

**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. Select apiary site | 1. Observations on ***key factors*** for an apiary site is conducted based on workplace procedures. 2. The apiary site is identified as per work place procedures |
| 1. Clear apiary site | 1. ***Materials, tools and equipment for clearing*** the apiary site are prepared as per workplace procedures. 2. The ***apiary site is cleared*** as per the workplace procedures and selected site. 3. The ground is levelled as per the site selected |
| 1. Fence apiary site | 1. ***Materials, tools and equipment for fencing*** the apiary site are prepared as per workplace procedures. 2. The apiary site is demarcated as per as per the size of the selected apiary. 3. Poles are fixed as per the workplace procedures 4. Barbed wire is fixed or live fence is planted as per the workplace procedures. 5. A lockable door/gate is fixed as per the workplace procedures. |
| 1. Prepare bee hives | 1. Bee hives are assembled as per workplace procedures 2. The bee hives are ***cleaned*** as per the workplace procedures 3. The hives are labelled as per the workplace procedures. 4. The hives are baited as per the available material. |
| 1. Install bee hives | 1. Hive stands/platforms are fixed as per the workplace procedures 2. Hives are hanged on stands/platforms or suspended between posts and trees based on the bee keeping manual. |
| 1. Construct bee house | * 1. ***Materials, tools and equipment for constructing the bee house*** are prepared as per workplace procedures, design and size of the bee house.   2. The bee house site is selected and prepared as per workplace procedures.   3. Size of the bee house determined as per the number of hives   4. The bee house constructed as per the workplace procedure or bee keeping manual   5. Post construction activities are carried out as per the workplace procedures. |
| 1. Manage apiary facilities | * 1. Bee forage and water resources are established based on the ecological zones   2. Unwanted vegetation is cleared as per workplace procedures   3. Pest control measures are applied as per the workplace procedure   4. Repair and maintenance of apiary facilitiesis conducted as per the 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.

|  |  |
| --- | --- |
| Variables | Range  Includes but not limited to: |
| 1. Key factorsMay Includes but not limited to: | * Forage and water resources * Accessibility * Proximity to public amenities * Natural hazards * Drainage * Terrain * Shade/shelter |
| 1. Materials, tools and equipment for clearingMay Includes but not limited to: | * Spades * tape measure * slashers * hoes * rake * PPE |
| 1. Apiary site is clearedMay Includes but not limited to: | * Stones * Excess vegetation * Tree stumps * Post hole digger |
| 1. Materials, tools and equipment for fencingMay Includes but not limited to: | * Barbed wire * Chain link * Poles * Seedlings and cuttings for live/hedge * Nails * Hammer * Mattock |
| 1. Cleaned May Includes but not limited to: | * Brushing * Burning grass inside |
| 1. Materials, tools and equipment for constructing the bee house May Includes but not limited to: | * Poles * Rafters, * Roofing material * Wire mesh * Nails * Timber * Mud * Blocks * Bricks |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking
* Appropriate use of tools and equipment.
* Bee products handling
* Numeracy
* Digital literacy

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of hives
* Importance of baiting
* Materials used for baiting
* Factors considered while establishing an apiary
* Hive placement 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. Observed key factors for an apiary site correctly 2. identified the apiary site as per work place procedures 3. Prepared materials, tools and equipment for clearing, fencing, constructing the apiary site as per workplace procedures. 4. Cleared the apiary site as per the workplace procedures and selected site. 5. Demarcated the apiary site as per as per the size of the selected apiary. 6. Fixed poles, barbed, lockable door/gate wire as per the workplace procedures 7. Assembled bee hives as per workplace procedures 8. Cleaned the bee hives as per the workplace procedures 9. Labelled and baited the hives as per the workplace procedures. 10. Fixed hive stands/platforms as per the workplace procedures 11. Hanged/suspended/place hives on stands/platforms or between posts and trees based on the bee keeping manual. 12. Selected and prepared the bee house site as per workplace procedures. 13. Determined size of the bee house as per the number of hives 14. Constructed the bee house as per the workplace procedure or bee keeping manual 15. Carried out post construction activities as per the workplace procedures. |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# CONSTRUCT BEE HIVES AND BEE EQUIPMENT

**UNIT CODE: AGR/OS/API/CR/03/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to construct bee hives and bee equipment. It involves preparing to construct bee hives and bee equipment, constructing beehives and bee equipment and completing construction of hives and bee equipment.

**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 to construct bee hives and bee equipment | 1. ***Materials and equipment for construction*** and repair of hives are identified as per the type of hive and bee equipment. 2. Personal protective equipment are worn as per the occupational health and safety procedures |
| 1. Construct beehives and bee equipment | 1. Materials and equipment for construction are assembled as per the requirements 2. Hivesand ***bee equipment*** constructed as per standard specifications 3. The quality of the hive and bee equipment is evaluated as per the standard specifications |
| 1. Complete construction of hives and bee equipment | 1. Hives and equipment are stored as per the workplace procedures 2. ***Waste is managed and disposed*** appropriately as per NEMA and 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.

|  |  |
| --- | --- |
| Variables | Range  Includes but not limited to: |
| 1. Materials and equipment for constructionMay Includes but not limited to: | * Timber * Flat metal bar * File for sharpening * Nails, hammers * Wood plainer * Joinery equipment * Tape measure * Iron sheets * Galvanized aluminum sheets and wire * Drilling machine * Pliers * Cotton material * Goose net * Coffee wire * Leather/Rexene gloves * Sewing machine * Tailoring scissors * Tin sip * Zips and elastic material |
| 1. Bee equipmentMay Includes but not limited to: | * Smokers * Hive tools * Honey extractors * Bee brush * Honey strainers * Sisal yarn * Solar wax extractors * Observation hive * Honey press * Steam wax extractor * PPE * Pollen trap * Catcher box * Propolis collector |
| 1. Waste is managed and disposed May Includes but not limited to: | * Burning * Burying * Recycling * Selling |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking
* Bee hive construction skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of hives and bee equipment
* Types of hives
* Hive standard specifications
* Evaluation of hive and bee equipment
* Waste Disposal procedures.
* Workshop technology
* Machine operation
* Maintenance of equipment

**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 materials and equipment for construction of hives as per the type of hive and bee equipment.   2. Used personal protective equipment as per the occupational health and safety procedures   3. Assembled materials and equipment for construction as per the requirements   4. Constructed and evaluated quality of hives and bee equipment as per standard specifications   5. Stored hives and equipment as per the workplace procedures   6. managed and disposed waste appropriately as per NEMA and workplace procedures |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# MANAGE BEE FACILITIES, TOOLS AND EQUIPMENT

**UNIT CODE: AGR/OS/API/CR/04/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to manage bee facilities, equipment and tools. It involves establishing a bee facility, equipment and tools identification system, performing bee facilities, equipment and tools routine inspection, maintaining the bee facilities, equipment and tools, disinfecting bee facilities, equipment and tools, storing bee facilities, equipment and tools and disposing bee facilities, equipment and tools.

**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. Establish a bee facility, equipment and tools identification system | 1. Relevant equipment and accessories are identified as per work place procedures 2. Suitable ***identification system*** is established as per work place procedures |
| 1. Perform bee facilities, equipment and tools routine inspection | 1. Routine inspection schedule is prepared as per the workplace procedures 2. Relevant facilities, tools and equipment for inspection are identified as per the relevant records 3. Personal protective equipment are worn as per the occupational health and safety procedures 4. Inspection of the tools and the equipment is carried out as per the type of the equipment and workplace guidelines/ manufacturers specification |
| 1. Maintain and repair bee facilities, equipment and tools | 1. Broken and obsolete facilities, equipment and accessories are identified as per work place procedures 2. The obsolete/broken facilities, equipment, tools and accessories are sorted according to the condition of disrepair 3. Obsolete and irreparable facilities and equipment are replaced as per work place procedures 4. Repairable facilities, equipment and tools are repaired as per work place procedures |
| 1. Disinfect bee facilities, equipment and tools | 1. Type of ***pest infestation*** is identified as per pest/disease control procedures 2. Suitable ***fumigant*** ***and fumigation***/***disinfection method*** is identified as per the infestation 3. Personal protective equipment are worn as per the occupational health and safety procedures 4. Disinfection procedures is performed as per pest control procedures |
| 1. Store bee equipment and tools | 1. Suitable storage space identified as per work place procedures 2. Suitable store procedure is identified as per work place regulations 3. Equipment, tools and accessories are sorted according to use 4. Equipment, tools and accessories are stored according to use the identified storage procedure |
| 1. Dispose bee equipment and tools | * 1. Equipment and tools are identified as per work place procedures   2. Suitable ***disposal procedure/method*** is identified as per workplace regulations   3. Disposal of obsolete and irreparable equipment and tools conducted as per the work place 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.

|  |  |
| --- | --- |
| Variables | Range  Includes but not limited to: |
| 1. Identification systemMay Includes but not limited to: | * Coding * Inventory establishment |
| 1. Pest infestationMay Includes but not limited to: | * Yellow jacket wasp * Ants * Termites * Hive beetles * Pirate wasps birds * Wax moths * Varroa mites * Lizards * Mice * Man * Honey badger * Monkeys |
|  | * Old engine oil * Repellants * Chloroform * Detergents * Disinfectant * Greece |
| 1. Disinfection methodMay Includes but not limited to: | * Application of pest repellant * Spraying * Cleaning * Chlorination |
| 1. Suitable disposal procedure/methodMay Includes but not limited to: | * Burning * Burying * Recycling * Selling |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types and use of equipment, tools and accessories.
* Record keeping
* Personal Protective Equipment
* Bee pests, diseases and predators
* Equipment’s standards
* Equipment and maintenance techniques
* Pest control methods
* Personal/ Environmental safety
* Store keeping

**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 relevant equipment and accessories as per work place procedures 2. Established suitable identification system as per work place procedures 3. Prepared routine inspection schedule as per the workplace procedures 4. identified relevant facilities, tools and equipment for inspection as per the relevant records 5. used personal protective equipment as per the occupational health and safety procedures 6. carried out inspection of the tools and the equipment as per the type of the equipment and workplace guidelines/ manufacturers specification 7. Identified, sorted, repaired and replaced broken and obsolete facilities, equipment and accessories as per work place procedures 8. Identified type of pest/disease infestation as per pest/disease control procedures 9. identified suitable disinfectant/fumigant and disinfection/fumigation method as per the infestation 10. used personal protective equipment as per the occupational health and safety procedures 11. performed disinfection procedures as per pest control procedures 12. sorted and stored Equipment, tools and accessories are according to use and identified storage procedure 13. identified suitable disposal procedure/method as per workplace regulations 14. Disposed obsolete and irreparable equipment and tools as per the work place procedures |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Third party reports   2. Written tests   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# MANAGE BEE FORAGE RESOURCES

**UNIT CODE: AGR/OS/API/CR/05/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required manage bee forage resources. It involves identifying suitable bee forage, establishing forage resources, conserving forage resources and developing a beekeeping flowering calendar

**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 suitable bee forage | 1. Suitable bee forage identified as per relevant bee keeping manuals 2. Suitable bee forage are classified as per the ecological zones 3. Suitable bee forage documented as per relevant bee keeping manuals 4. Bee forage gap identified as per the floral calendar. |
| 1. Establish bee forage resources | 1. Suitable site for establishment identified as per the available resources and ecological zones 2. Method of establishing bee forage resources is adopted. 3. Tools and equipment for establishing bee forage resources identified and assembled as per adopted method. 4. Preparation of the site conducted as per the workplace procedures 5. Forage species planted as per available manuals. 6. ***Post- forage establishment activities*** are conducted as per the workplace procedures. |
| 1. Develop a beekeeping flowering calendar | 1. ***Bee forage species*** are identified and documented as per available manuals 2. Flowering cycles identified as per the season and ecological zones 3. Floral gaps are identified as per the cycles 4. Flowering cycles documented as per the season and ecological zones 5. The flowering calendar is disseminated as per the workplace |
| 1. Conserve forage resources | 1. ***Forage conservation methods*** are identified as per relevant manuals 2. Community based conservation is embraced based workplace procedures 3. Suitable forage husbandry, habitat conservation programs adopted as per the workplace procedures 4. Continuous monitoring of bee forage conservation is conducted as per the 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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Forage conservation methodsMay Includes but not limited to: | * Tree nursery establishment * Agroforestry * Propagation * Protection of floral reserves and habitats |
| 1. Bee forage speciesMay Includes but not limited to: | * Citrus trees * Avocado * Key apple * Eucalyptus * Passion * Bananas * Acacia species * Cucumber * Pumpkin * Bottle brush * Neem tree * Calliandra spp * Coffee * Croton spp * Sisal * Maize * Sunflower * Mango tree * Leucena * Prosopis * Dombeya * Clover * Macadamia * Fuchsia spp * Angels trumpet * Guava |
| 1. Post- forage establishment activitiesMay Includes but not limited to: | * Pollarding * Coppicing * Weeding * Pruning * Pest control * Thinning * Transplanting * Irrigating * Pegging * Training |
| 1. Equipment and toolsMay Includes but not limited to: | * Buckets * Watering cans * Sticks (landing boards) |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Water requirements for bees
* Bee forage resources conservation
* Pollen plants and nectar plants
* Flowering cycle
* Bee Botany
* Seed propagation
* Nursery/Seedbed Preparation

**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, classified and documented suitable bee forage as per relevant bee keeping manuals and the ecological zones   2. Suitable site for establishment identified as per the available resources and ecological zones   3. Implemented method of establishing bee forage resources depending on the ecological zones and available resources.   4. Identified and assembled tools and equipment for establishing bee forage resources as per the method.   5. conducted site preparation as per the workplace procedures   6. Planted forage species as per available manuals.   7. Performed post- forage establishment activities as per the workplace procedures.   8. identified and documented bee forage species as per available manuals   9. Identified flowering cycles as per the season and ecological zones   10. Identified floral gaps as per the cycles   11. Documented flowering cycles as per the season and ecological zones   12. identified forage conservation methods as per relevant manuals   13. Promoted community based conservation based workplace procedures   14. implemented Suitable forage husbandry and habitat conservation programs as per the workplace procedures   15. conducted Continuous monitoring of bee forage conservation as per the workplace procedures |
| 1. Resource implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# MANAGE HONEY BEE SWARMS

**UNIT CODE: AGR/OS/API/CR/06/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to Manage honey bee swarms. It involves preparing to catch/trap a swarm of honey bees, catching/trapping a swarm of honey bees and performing post-trapping 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. Prepare to catch/trap a swarm of honey bees | 1. The number of hives to be stocked identified as per apiary records. 2. A schedule for trapping/catching and stocking honey bee swarms is developed as per workplace procedures 3. Suitable ***trapping sites*** identified as per the relevant bee keeping manuals. 4. Relevant ***tools and equipment*** are identified and assembled as per relevant workplace procedures 5. Suitable PPE are worn as per the OSH |
| 1. Catch/trap a swarm of honey bees | 1. The catcher box is set at the relevant site 2. The new swarm is transported to the new apiary as per the relevant manuals 3. The new colony is hived as per the relevant manuals |
| 1. Perform post-trapping activities | 1. Regular colony monitoring is conducted to check the progress of the new colony 2. Suitable ***colony management measures*** are applied as per the 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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Suitable swarming control measureMay Includes but not limited to: | * Colony division * Artificial feeding * Queen cells destruction * Creating space through supering * Honey harvesting * Selection * De-queening and re-queening * Providing shade |
| 1. Trapping sites May Includes but not limited to: | * Bee migratory roots * Bee reserve/bulking areas |
| 1. Tools and equipmentMay Includes but not limited to: | * Smoker * Catcher * Rope * Ladder * Swarm nets * Swarm catcher |
| 1. Check signs of swarmingMay Includes but not limited to: | * Presence of queen cells along the edges of the comb * Increase of drawn bees * Crowding of the hive and hive entrance * Increased defensiveness |
| 1. Colony management measuresMay Includes but not limited to: | * Feeding * Pest control * Introduce * Adding brood combs * Merging colonies |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Honey Bee behavior
* Transportation of live bees
* Feeding of Bees
* Colony management
* Breeding 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. Developed a schedule for trapping/catching and stocking honey bee swarms as per workplace procedures 2. Identified suitable trapping sites as per the relevant bee keeping manuals. 3. Identified and assembled relevant tools and equipment as per relevant workplace procedures 4. Identified the number of hives to be stocked as per apiary records. 5. Set the catcher box at the relevant site appropriately 6. Transported the new swarm to the new apiary as per the relevant manuals 7. Hived the new colony as per the relevant manuals 8. Conducted regular colony monitoring to check the progress of the new colony 9. Applied suitable colony management measures as per the workplace procedures |
| 1. Resource implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# MANAGE HONEY BEE COLONY

**UNIT CODE: AGR/OS/API/CR/07/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to manipulate honey bee colony. It involves preparing for honey bee colony manipulation, handling honey bee combs, handling honey bee colony manipulation, raising queen bees and performing post-manipulation practices bee colony manipulation.

**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 for honey bee colony manipulation | 1. Manipulation schedule is prepared based on ***apiary records*** 2. ***Materials and equipment*** for manipulation are identified as per the workplace procedures/standards. 3. ***Personal protective equipment*** is worn as per the occupational health and safety procedures |
| 1. Handle honey bee combs | 1. The ***bee hive*** is opened as per workplace procedures 2. ***Combs*** are identified as per the workplace procedures 3. Combs are removed in planned sequence and placed in suitable position. 4. Combs are replaced in same or new sequence or positions or removed to another hive according to the purpose of comb rearrangement |
| 1. Handle honey bee colony | 1. Strong colonies with ***desired characteristics*** are identified based on colony records. 2. ***Tools and equipment for dividing the colony*** are identified and used as per the workplace procedure 3. Honey bee colony is divided as per the workplace procedures 4. Brood nest is renewed as per the workplace procedure and the apiary records 5. The new colony is transferred as per the workplace procedures 6. The honey bee colonies are merged as per the workplace procedures 7. The honey bee colonies are fed as per workplace procedures 8. Bee colony **strengthened** as per workplace procedures 9. Breeding colonies are selected as per the desirable characteristics |
| 1. Raise queen bees | 1. ***Breeder colonies*** are identified as per the desirables characteristics 2. ***Tools and equipment*** for raising queen bees are prepared as per workplace procedures 3. The colony is de-queened as per the workplace procedures. 4. Artificial insemination is performed as per the colony records and AI manual and bee breeding manual. 5. Queen bees are raised as per the objectives |
| 1. Perform post-manipulation practices bee colony manipulation | 1. Honey bee manipulation records are prepared 2. Honey bee manipulation reports are prepared 3. Honey bee colony is monitored as per the records and purpose of manipulation. 4. ***Appropriate action*** taken depending on the observation. 5. ***Manipulation waste*** is ***disposed*** as per the 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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Apiary records May Includes but not limited to: | * Hive records * Colony performance records * Queen records * Production records * Colony behavior records * Forage records |
| 1. Materialsand equipmentMay Includes but not limited to: | * Smoker * Smoker fuel * Match box * PPE * Hive tool * Bee brush * Catcher box * Honey super * Feeder box * Feed supplements |
| 1. Personal protective equipment May Includes but not limited to: | * Veil * Gloves * Gumboots * Hat/cap |
| 1. Bee hive May Includes but not limited to: | * Langstroth * Kenya top bar hive * Frame hive * Box hive * Mud hive * Bark hive * Bamboo * Basket * Log hive * Observation hive * Floor hive |
| 1. Combs May Includes but not limited to: | * Brood combs * Honey combs * Pollen combs * Old combs * New combs |
| 1. Desired characteristics May Includes but not limited to: | * Defensiveness * Less tendency to swarming, * Productivity, prolific, * Egg laying rate of the queen * Pest and disease resistance |
| 1. Tools and equipment for dividing the colony May Includes but not limited to: | * Catcher box * Hives * Hive tools * PPE * Bee brush * Smoker * Smoker fuel |
| 1. Strengthened May Includes but not limited to: | * Merge * Feed * Adding brood combs * Re-queen |
| 1. Breeder colonies May Includes but not limited to: | * Queen traits and lines * Drone traits and lines |
| 1. Tools and equipment May Includes but not limited to: | * Queen cups * Cell bar frames * Grafting spatula and needles * Queen cage * AI kit |
| 1. Appropriate action May Includes but not limited to: | * Quarantine measures * Feeding * Colony transfer * Pest and disease control |
| 1. Manipulation waste May Includes but not limited to: | * Infected combs * Broken * Damaged * Old combs * Damaged top bars or frames * Dilapidated hives |
| 1. Disposed May Includes but not limited to: | * Burning * Burying |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Use of tools and accessories
* Type of smoker fuel
* Types of smokers
* Purpose of manipulation
* Types of hives
* Colony behavior
* Weather conditions
* Types of combs and uses
* Desirable characteristics of breeding colonies
* Type of hive
* Breeding objectives
* Breeding 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. Prepared Manipulation schedule based on apiary records   2. Identified materials and equipment for manipulation correctly   3. Used Personal protective equipment appropriately.   4. Opened the bee hive as per the workplace procedures.   5. Identified and rearranged the combs appropriately.   6. manipulated combs as per the purpose   7. Identified colonies with desired characteristics based on colony records.   8. Identified and used tools and equipment for dividing the colony as per the workplace procedure   9. Divided honey bee colony as per the workplace procedures.   10. Renewed brood nest as per the workplace procedure and the apiary records   11. Transferred the new colony as per the workplace procedures   12. Strengthened bee colony as per workplace procedures   13. Selected breeding colonies as per the desirable characteristics   14. Identified breeder colonies as per the desirables characteristics   15. prepared tools and equipment for raising queen bees are as per workplace procedures   16. Raised Queen bees as per the workplace procedures   17. Prepared honey bee colony manipulation records and reports   18. Monitored honey bee colony as per the records and purpose of manipulation.   19. Took appropriate action depending on the observation.   20. Disposed waste according to workplace procedures |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# CONTROL HONEY BEE PESTS AND DISEASES

**UNIT CODE: AGR/OS/API/CR/08/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to control pests and disease within a honey bee colony. It involves inspecting the bee colony, assessing health and condition of bee brood, assessing health and condition of adult bees and managing bee pests and diseases.

**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 to inspect the bee colony | 1. ***Tools and materials for colony inspection*** identified according to work place procedures 2. Protective gears are worn as per the procedures 3. Hive is smoked and opened according to workplace procedures 4. Colonies to be inspected are identified based on apiary records |
| 1. Assess health and condition of bee brood | 1. Brood combs are identified according to the procedure 2. Observation of ***signs and symptoms of pests and diseases*** evidence is doneaccording to bee brood health guidelines 3. Samples for testing and evidence to support a diagnosis are collected. 4. The brood diseases is identified |
| 1. Assess health and condition of adult bees | 1. Bee castes are identified in the colony according to the procedure 2. Observation of signs of pests and diseases in the colony according to bee health guidelines 3. Samples for testing and gather evidence to support a diagnosis collected based on workplace procedures 4. Biosecurity measures implemented   3.5 Results of inspections recorded and any remedial action taken |
| 1. Manage bee pests and diseases | 1. Affected colonies are identified according to work place procedure 2. Weak colonies are strengthened according to the procedure 3. ***Remedial measures*** put implemented as per the 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.

|  |  |
| --- | --- |
| Variables | Range  Includes but not limited to: |
| 1. Signs of pests and diseases | * Weak and inactive colonies, * Irregular queen laying patterns * Buzzing, * Deformations * Crawling and dead bees at the hive entrance * Dying colonies * Fallen hives * Poles * Chalky mummified |
| 1. Tools and materials for colony inspection | * Smokers * Bee brush * Hive tool * PPE * Smoker fuel * Sample bottles/vials * Cotton wool * Preservatives * Chloroform |
| 1. Remedial measures | * Isolated * Destroyed * Treated * Burned * Buried * maintained |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Use of tools and accessories
* Use of the right fuel material for the smoker
* Right approach to the hive
* Appearance of health and un health brood
* Brood pests and diseases
* Castes differentiation
* Bee communication
* Bee pests and disease identification
* Pest infestation
* Differentiation of strong/ weak colonies
* Different pests/ disease control measures

**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 tools and materials for colony inspection according to work place procedures   2. Wore protective gears as per the procedures   3. Smoked and opened the hive according to workplace procedures   4. Identified colonies to be inspected are based apiary records   5. Identified brood combs according to the procedure   6. Observed signs and symptoms of pests and diseases evidence according to bee brood health guidelines   7. Collected samples for testing and evidence to support a diagnosis   8. Identified the brood diseases correctly.   9. Observed signs of pests and diseases in the colony according to bee health guidelines   10. Recorded results of inspections and took remedial action   11. Implemented biosecurity measures.   12. identified affected colonies according to work place procedure   13. implemented remedial measures as per the workplace procedures |
| 1. Resource implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# HARVEST BEE PRODUCTS

**UNIT CODE: AGR/OS/API/CR/09/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to harvest bee products. It involves preparing to harvest bee products, conducting bee product harvesting, extracting bee products and performing post-harvest practices.

**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 to harvest bee products | 1. Colonies to be harvested are identified as per workplace procedures. 2. ***Materials and equipment*** are identified as per workplace procedures. 3. Materials and equipment’s assembled the as per workplace procedures 4. Personal protective equipment are worn as per the occupational health and safety procedures |
| 1. Conduct bee product Harvesting | 1. Hive is opened as per the workplace procedures 2. Ripe honey is harvested as per the workplace procedures 3. Bee propolis is harvested as per workplace procedures 4. Bee pollen is trapped and collected as per workplace procedures 5. Bee broods are harvested as per workplace procedures 6. Royal jelly harvested as per workplace procedures |
| 1. Extract bee products | 1. Bee venom is extracted as per workplace procedures 2. Bee honey is extracted as per workplace procedures 3. Bee wax extracted as per workplace procedures |
| 1. Perform post-harvest practices | 1. Bee products are weighed based on the workplace procedures 2. Graded as per the workplace procedures 3. ***Bee production records*** are prepared as per the workplace procedures 4. Bee products transported(where necessary) as per the workplace procedures 5. ***Bee products*** are stored as per health and storage specifications |

**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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Materials and equipment May Includes but not limited to: | * Harvesting and storage containers * Smokers * PPE kit * Bee brush * Bee escape |
| 1. Bee products production records May Includes but not limited to: | * Quality * Classification * Quantity per hive records |
| 1. Bee products May Includes but not limited to: | * Bee wax * Pollen * Royal jelly * Venom * Bee broods |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking
* Harvesting techniques
* Extraction techniques
* Appropriate use of tools and equipment.
* Bee products handling
* Numeracy
* Digital literacy

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of bee products
* Equipment and techniques in bee product harvesting
* Types of PPE
* Safe use of tools and equipment
* Bee behavior
* Equipment for extraction
* Bee products harvesting and, storage.
* Bee products uses

**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 colonies to be harvested as per workplace procedures. 2. Identified and assemble Materials and equipment 3. Used personal protective equipment as per the occupational health and safety procedures 4. Opened hive as per the workplace procedures 5. Harvested ripe honey , propolis, pollen, bee broods and royal jelly as per the workplace procedures 6. Extracted bee venom , honey bees wax pollen as per workplace procedures 7. Weighed and graded bee products based on the workplace procedures 8. Prepared bee production records as per the workplace procedures 9. Stored bee products as per health and storage specifications |
| 1. Resource Implications for competence certification | The following resources must be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# PROCESS BEE PRODUCTS

**UNIT CODE: AGR/OS/API/CR/10/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to provide bee extension services. It involves separating different bee products, preparing processing equipment, processing bee honey bee wax, propolis , pollen and Processing bee venom

**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 bee products for processing | 1. Bee products identified 2. Products put in different containers |
| 1. Prepare processing equipment | 1. Processing method identified as per the workplace procedures 2. Identification of processing equipment as per the workplace procedures 3. Assemble processing equipment as per the workplace procedures 4. Set up the processing equipment as per the workplace procedures 5. Hygienic and safety measures considered as per the workplace procedures |
| 1. Process honey | 1. ***State/form of honey*** identified as per the workplace procedures 2. Right processing steps initiated as per workplace guidelines 3. Processed honey is stored in appropriate containers/materials as per the workplace procedures |
| 1. Process bees wax | 1. Combs selected and assembled as per the workplace procedures 2. Right processing steps initiated as per workplace guidelines 3. Wax allowed to settle and stored appropriately as per the workplace procedures |
| 1. Process propolis | 1. Raw propolis is collected as per the workplace procedures 2. Foreign materials removed as per the workplace procedures 3. Right processing steps initiated as per workplace guidelines 4. Propolis is stored as per the workplace procedures |
| 1. Process pollen | 1. Pollen removed from pollen traps or combs 2. Pollen sorted as per the workplace procedures 3. Pollen dried as per the workplace procedures 4. Pollen stored as per the workplace procedures |
| 1. Process bee venom | * 1. PPE for processing bee venom   2. Storage conditions   3. Right processing steps initiated as per guidelines |

**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.

|  |  |
| --- | --- |
| Variables | Range |
| State/form of honey May Includes but not limited to: | * Raw honey * Semi processed * Decanted * Comb honey * Granulated |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Bee products
* Processing equipment
* Work place safety precautions
* Public heath
* Different forms of honey
* Honey processing methods
* Food grade materials
* Differentiation of Honey bee combs
* Wax processing
* Wax storage 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. Identified bee products   2. Identified processing equipment   3. Assembled processing equipment   4. Considered hygienic and safety measures   5. Identified state of honey based on workplace procedures   6. Initiated right processing steps as per guidelines   7. Stored processed honey in appropriate containers/materials   8. Identified and assembled empty combs   9. Settled and stored wax appropriately   10. Collected raw propolis   11. Removed foreign materials from propolis   12. Stored propolis as per the workplace procedures   13. Removed pollen from pollen traps or combs   14. Sorted pollen   15. Dried pollen   16. Stored pollen   17. Initiated right processing steps as per guidelines |
| 1. Resource Implications for competence | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# MANAGE QUALITY OF BEE PRODUCTS

**UNIT CODE: AGR/OS/API/CR/11/6/A**

**UNIT DESCRIPTION:**

This unit specifies the competencies required to manage quality of bee products. It involves establishing food safety and quality systems, managing quality operations, preparing for raw material and product analyses and carrying out raw material and product analyses.

**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. Establish food safety and quality systems | * 1. ***Food safety and quality systems*** are designed and established as per regulatory and statutory requirements and workplace quality manual   2. Food safetyand quality systemsare implemented and maintained as per legal and regulatory requirements and workplace quality manual   3. Food safety and quality records are developed and maintained according to legal and regulatory requirements |
| 1. Manage quality operations | * 1. Quality operations are planned and executed as per overall workplace plan   2. Quality operations resources are allocated and controlled as per workplace policy.   3. Quality operations are organized as per workplace policy.   4. Quality operations are coordinated as per workplace policy.   5. Audit of quality operations is carried out based on workplace policy.   6. Leadership is provided based on workplace policy |
| 1. Prepare for bee product analyses | * 1. ***Laboratory standards*** are established as per Codex/ AOAC/KEBS and workplace quality manual.   2. Laboratory standards are implemented based on Codex/ AOAC (International laboratory standards) and workplace quality manual.   3. Laboratory status is confirmed according to laboratory code of practice.   4. ***Regulatory and statutory requirements*** for food laboratory practices are adhered to |
| 1. Carry out bee products analyses | * 1. ***Sampling procedures*** are adhered to as per workplace quality manual   2. Samples are prepared and analyzed based on specific ***test*** procedure   3. Testing reagents are prepared and equipment calibrated according to specifications   4. Bee products analysis carried out as per the workplace procedures   5. Analyses results are interpreted, reported and appropriate decisions made based on test outcomes and workplace standards.   6. Retain reference sample as per the workplace procedure |

**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  *May include but is not limited to:* |
| --- | --- |
| 1. Laboratory standards May Includes but not limited to: | * AOAC/CODEX * National laboratory standards * Workplace laboratory standards * KEBS |
| 1. Regulatory and statutory requirements May Includes but not limited to: | * Cap 242 (public health act) * Cap 254 (food, drugs and chemical substances act) * NEMA regulations * OSH Act 2007 * Veterinary Act |
| 1. Sampling procedures May Includes but not limited to: | * General-Random, Stratified * Workplace * Workplace procedures |
| 1. Tests May Includes but not limited to: | * Micro-biological * Physical * Chemical * Organic * Organoleptic |
| 1. Food safety and quality systems May Includes but not limited to: | * International standards e.g. FSSC, ISO GFSI PRC, HACCP * National standards e.g. KEBS * Workplace 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
* Interpersonal
* Leadership
* Planning
* Problem solving
* Route cause analysis
* Negotiation
* Interpretation
* Trouble shooting
* Apparatus handling
* Analytical
* Sampling
* Training/facilitation
* Computer

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Food chemistry
* Food Analysis
* Food microbiology
* Quality/Safety management Systems
* Quality management
* Pest and rodent control
* Emerging Issues
* Principles of food engineering
* Environmental safety
* Laboratory 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. Demonstrated knowledge of laboratory standards   2. Demonstrated knowledge of relevant legal, statutory and regulatory requirements.   3. Adhered to lab code of practice.   4. Demonstrated knowledge of various sampling techniques.   5. Demonstrated ability to carry out food lab test/analyses.   6. Reported and interpreted test results correctly and objectively.   7. Demonstrated knowledge of various quality and food safety systems. |
| 1. Resource Implications for competence certification | The following resources **MUST** be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks. |
| 1. Methods of Assessment | Competency may be assessed through:   * + Observation   + Oral questioning   + Projects   + Written tests   + Third party   + Portfolio |
| 1. Context of Assessment | Competency **MAY** be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# PERFORM BEE PRODUCT VALUE ADDITION

**UNIT CODE: AGR/OS/API/CR/12/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to perform bee product value addition. It involves preparing the equipment, materials and supplies for value addition, processing wax-based value-added products, processing honey-based value-added products, processing propolis based value added products, processing royal jelly-based value-added products, processing bee venom-based value-added products, packaging, branding and marketing value added bee products.

**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 the equipment, materials and supplies for value addition | 1. ***Equipment’s and materials for value addition*** are prepared as per the workplace policy. 2. PPE are worn according to Occupational Health and Safety procedures. 3. ***Value added products*** are identified based on workplace procedures and demand. |
| 1. Process wax-based value-added products | 1. ***Wax based value added products*** processed as per Workplace procedures |
| 1. Process honey-based value-added products | 1. ***Honey based value added products*** are processed as per Workplace procedures |
| 1. Process propolis based value added products | 1. ***Propolis based value added products*** are processed as per Workplace procedures |
| 1. Royal jelly-based value-added products | 1. ***Royal jelly-based value-added products*** are processed as per Workplace procedures |
| 1. Process bee venom-based value-added products | * 1. ***Bee venom-based value-added products*** are processed as per Workplace procedures |
| 1. Package, brand and market value added bee products | * 1. Bee products packaged as per industry standards   2. Bee products labelled and branded as per industry standards   3. Bee products marketed as per industry regulations |

**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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Equipment’s and materials for value addition May Includes but not limited to: | * Honey extractor * Uncapping knife * Processing, straining and settling tanks * Packaging materials * Bottles and jars * Labels * Weighing scales * Perfumes * Buckets * Ginger * Hibiscus * Medicinal plants * Propolis capsules * Vegetable oils |
| 1. Value added products May Includes but not limited to: | * Wax based * Honey based * Propolis * Royal jelly * Bee venom |
| 1. Wax based value added products May Includes but not limited to: | * Candles * Body cream * Soaps * Sandal cream * Cosmetics * Pharmaceutical capsule covers |
| 1. Honey based value added products May Includes but not limited to: | * Honey juice * Honey wine * Honey ice cream * Concoctions * Honey cakes and bread * Peanuts * Cough syrups |
| 1. Propolis based value added products May Includes but not limited to: | * Propolis tincture * Propolis ointments * Propolis cream * Propolis capsules |
| 1. Royal jelly-based value-added products May Includes but not limited to: | * Royal jelly syrup * Cream capsules * Ointment * Jelly * Lotion |
| 1. Pollen-based value-added products May Includes but not limited to: | * Pollen capsules * Pollen/bee bread |
| 1. Bee venom-based value-added products May Includes but not limited to: | * Bee venom capsules * Anti-wrinkle cream * Mask/ anti-ageing * Cleansing balm |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Food quality materials.
* Design of processing premises
* Recipes for value added bee products.
* Processing of bee products
* Consumer Behavior
* Marketing of consumer products

**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. Prepared equipment’s and materials for value addition as per the workplace policy.   2. Used PPE according to Occupational Health and Safety procedures.   3. Processed wax based, honey based, propolis based, royal jelly-based, bee venom-based value-added products as Workplace procedures   4. Packaged, labelled, branded and marketed bee products as per industry standards |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# 

# APPLY BEE MICROSCOPIC TECHNIQUES

**UNIT CODE: AGR/OS/API/CR/13/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to apply bee microscopic techniques. It involves performing bee microscopy, operating bee microscopy equipment and tools, maintaining and protecting equipment and tools.

**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 bee microscopy equipment and tools | 1. Right ***equipment and materials*** identified and assembled 2. Bee microscopy equipment and tools prepared as per the microscopy principles |
| 1. Perform bee microscopy | 1. The specimen is identified 2. The specimen is prepared 3. Microscopic procedures applied according to the purpose |
| 1. Maintain and protect bee microscopy tools and equipment. | 1. Careful handling practices maintained 2. After use hygienic requirements observed 3. Bee microscopy tools and equipment are cleaned and stored based on 4. Safe proper storage 5. Precision and calibration is maintained |

**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.

|  |  |
| --- | --- |
| Variables | Range |
| Equipment and materials May Includes but not limited to: | * Magnifying lens * Sensitive balances * Surgical blades * Dissecting kits * Specimen slides * Stains * Filters * PPE |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Use of microscope
* Honey bee anatomy
* Use of microscopic equipment, materials and tools
* microscope technology
* sanitation 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. identified and assembled right equipment and materials   2. prepared Bee microscopy equipment and tools as per the   3. identified and prepared the specimen is   4. applied Microscopic procedures according to the purpose   5. maintained Careful handling practices   6. observed After use hygienic requirements   7. cleaned and stored based on Bee microscopy tools and equipment are   8. maintained precision and calibration |
| 1. Resource Implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# CONDUCT RESEARCH IN BEE KEEPING

**UNIT CODE: AGR/OS/API/CR/14/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to conduct research in bee keeping. It involves identifying a research problem, formulating hypothesis or research questions, conducting literature review, developing research design and methodology, conducting data collection, conducting data analysis and presentation, preparing research proposal and preparing research report.

**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 a research problem | 1. Research problem identified as per requirements of industry 2. The scope of the study defined as per the research problem 3. A research title is formulated based on objective. |
| 1. Formulate hypothesis or research questions | 1. Research objectives are identified based on the title. 2. Research questions are established based on the objectives. 3. Hypothesis is formulated base on the research questions. |
| 1. Conduct literature review | 1. ***Sources of information*** are identified, assessed and analyzed based on research objectives. 2. Relevant information is read and cited based on area of study |
| 1. Develop research design and methodology | 1. The locality/site of the study identified based on the research objective. 2. Materials, methods and procedures identified based on the research problem. 3. A schedule of the study prepared based on timeframe of the study. 4. Research budget prepared based on the scope of the research 5. ***Types of research design*** are identified and selected based on the research objectives. 6. ***Sampling techniques*** are selected and established in line with the research design. 7. ***Data analysis techniques*** are selected and established research objective and research design. 8. Validity and reliability of research instruments is determined as per the research design. |
| 1. Prepare research proposal | 1. Parts of a research proposal identified 2. Research proposal formulated 3. General topic determined 4. Literature review Performed 5. Gap in the literature identified 6. Statement of the problem framed 7. Research hypotheses and or research questions determined 8. Method of investigation determined 9. Research design determined 10. Research budget is prepared 11. Sample Size and the characteristics of the Sample are determined 12. Data Collection and data analysis Procedures are determined |
| 1. Conduct data collection, | 1. Data collection tools identified based on the research design 2. ***Sources of data*** are identified and assessed based on the research objective. 3. ***Methods of data collection*** are identified, assessed and analyzed based on the research design. 4. Data is collected in line with research objectives. |
| 1. Conduct data analysis and presentation | 6.1 Data is analyzed and interpreted in line with research objectives.  6.2 Data processed and presented as per relevant methodology |
| 1. Prepare research report | 8.1 Research report format identified as per relevant standards  8.2 Research report prepared as per standards   * 1. Data collected is analyzed as per SOPs   2. Research findings are determined as per work place procedures   3. Research findings are presented as per SOPs   4. Research conclusions are made as per analyzed report.   5. Research recommendations are carried out based on the result |

**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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Sources of informationMay Includes but not limited to: | * Primary * Secondary |
| 1. Types of research design May Includes but not limited to: | * Descriptive * Experimental * Case study * Correlational |
| 1. Sampling techniques May Includes but not limited to: | * Probability * Non-probability |
| 1. Data analysis techniques May Includes but not limited to: | * Hypothesis test |
| 1. Sources of data May Includes but not limited to: | * Primary * Secondary |
| 1. Methods of data collection May Includes but not limited to: | * Questionnaire * Interviewing * Observation |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking
* Presentation skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Research methods
* Technical report writing
* Communication skills
* Presentation skills

**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 Research problem as per requirements of industry 2. Defined the scope of the study as per the research problem 3. Formulated a research title-based objective. 4. Identified Research objectives based on the title. 5. Established Research questions based on the objectives. 6. Identified Sources of information based on research objectives. 7. Reviewed and cited Relevant information is based on area of study 8. Identified the locality/site of the study based on the research objective. 9. Identified Materials, methods and procedures based on the research problem. 10. Prepared a schedule of the study based on timeframe of the study. 11. Prepared Research budget based on the scope of the research 12. Identified and selected Types of research design are based on the research objectives. 13. Data analysis techniques are selected and established research objective and research design. 14. Determined Validity and reliability of research instruments is as per the research design. 15. Developed a research proposal 16. Determined research design 17. Determined Data Collection Methods and data analysis Procedures 18. Identified Data collection tools based on the research design 19. Collected Data is in line with research objectives. 20. Analyzed and interpreted Data is in line with research objectives. 21. Processed and presented Data as per relevant methodology 22. Identified Research report format as per relevant standards 23. Prepared Research report as per standards 24. Determined and presented Research findings as per work place procedures |
| 1. Resource implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |

# PROVIDE BEE KEEPING TRAINING AND EXTENSION SERVICES

**UNIT CODE: AGR/OS/API/CR/15/6/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to provide bee keeping training and extension services. It involves conducting community mobilization, forming community groups and leadership structures, creating awareness on bee keeping opportunities, developing extension packages, carrying out community training, developing community action plansand establishing research extension linkages

**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 community mobilization | 1. Target area/groups identified based on objective. 2. Need assessment conducted based on the workplace procedures. 3. Prioritization of the needs is conducted according to the resources available 4. Interventions developed based on the needs assessment. 5. Interventions are implemented based on the work plan. 6. Monitoring and evaluation is conducted based on the workplace procedure. |
| 1. Form community groups and leadership structures | 1. Areas of common interests identified based on the need assessment report. 2. Capacity building of stakeholders is conducted based on the identified knowledge gaps. 3. Election conducted based on the existing legal guidelines. 4. Group norms established based on existing legal guidelines |
| 1. Create awareness on bee keeping opportunities | * 1. Beekeeping information publication developed as per the workplace procedures.   2. Sensitization meetings conducted as per the workplace procedures   3. Field exposure visits organized as per the workplace procedures |
| 1. Develop extension packages | * 1. ***Training materials*** identified based on workplace procedures   2. ***Training methods*** identified based on workplace procedures   3. Training of trainers is conducted based on trainingmanuals |
| 1. Carry out community training | 1. Training needs assessment conducted as per the industry guidelines 2. Training tools and materials/aids identified and assembled as per the workplace procedures. 3. Training venue identified based on workplace procedures. 4. Community training program/ schedule developed as per the training needs report 5. Community training is conducted as per the schedule. |
| 1. Develop community action plans | 1. Community needs prioritized according to the resources available 2. Interventions developed based on the group interest. 3. Interventions are implemented based on the work plan. 4. Monitoring and evaluation conducted based on the workplace procedure. |
| 1. Establish research extension linkages | * 1. Technologies / innovations are identified based documented research findings   2. Service providers and research institutions are identified based on the identified technologies and innovations   3. Collaborative research is conducted based on workplace procedures and terms of reference   4. Public private partnerships are developed based on existing policies and workplace procedures.   5. Marketing linkages are developed based on existing policies and 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.

|  |  |
| --- | --- |
| Variables | Range |
| 1. Training materials May Includes but not limited to: | * Brochures * Flip charts * Videos * Handbooks * Manuals * Speakers |
| 1. Training methods May Includes but not limited to: | * Demonstrations * Seminars and workshops * Field days * Farmers exchange programs * Farm visits * Agricultural shows * Radio |

**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:

* Organizing skills
* Analytical skills
* Negotiation skills
* Interpersonal skills
* Communication skills
* Evaluation skills
* Problem solving
* Critical thinking

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Extension communication skills
* Data collection and analysis
* Report writing and compiling
* Group dynamics
* Community dynamics
* Communication skills
* Transparency and accountability
* Monitoring and evaluation
* Publication technologies
* Net-works and linkages

**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 target area/groups based on production data. 2. Conducted needs assessment based on the workplace procedures. 3. Prioritized the needs in line with the resources available 4. Developed and implemented interventions based on the need’s assessment. 5. Conducted monitoring and evaluation based on the workplace procedure. 6. Identified areas of common interests based on the need assessment report. 7. Conducted capacity building of stakeholders based on the identified knowledge gaps. 8. Established group norms based on existing legal guidelines 9. Conducted sensitization meetings as per the workplace procedures 10. Organized field exposure visits as per the workplace procedures 11. Identified training materials 12. Identified training methods 13. Conducted training of trainers based on training manuals 14. Identified and assembled training tools and materials/aids as per the workplace procedures. 15. Identified training venue based on workplace procedures. 16. Developed community training program/ schedule as per the training needs report 17. Conducted community training as per the schedule. 18. Prioritized community needs according to the resources available 19. Identified technologies / innovations based documented research findings 20. Identified service providers and research institutions based on the identified technologies and innovations 21. Conducted collaborative research based on workplace procedures and terms of reference 22. Developed public private partnerships based on existing policies and workplace procedures. |
| 1. Resource implications for competence certification | The following resources must be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Third party reports   3. Oral questioning   4. Interview   5. Observation |
| 1. Context of Assessment | Assessment could be conducted:   1. On-the-job 2. Off-the–job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with related units in the sector |