****

**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM**

**FOR**

**BEE HIVES AND BEE EQUIPMENT CONSTRUCTION**

**LEVEL 3**

**ISCED CODE: 0214 254A**

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# FOREWORD

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

Reforms in the education sector are necessary to achieve Kenya Vision 2030 and meet the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution, and this resulted in the formulation of the Policy Framework for Reforming Education and Training in Kenya (Sessional Paper No. 14 of 2012). 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 based on demonstration of competence, and the mode of delivery allow for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed. For trainees to build their skills on foundational hands-on activities of the occupation, units of learning are grouped in modules. This has eliminated duplication of content and streamlined exemptions based on skills acquired as a trainee progresses in the up-skilling process, while at the same time allowing trainees to be employable in the shortest time possible through the acquisition of part qualifications.

It is my conviction that this curriculum will play a great role in developing competent human resources for the Agriculture Sector’s growth and development.

**PRINCIPAL SECRETARY**

**STATE DEPARTMENT FOR TVET**

**MINISTRY OF EDUCATION**

**PREFACE**

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

TVET Act, CAP 210A and Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya for Sustainable Development 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 the Kenyan labour force.

This curriculum has been developed in adherence to the Kenya National Qualifications Framework and CBETA standards and guidelines. The curriculum is designed and organized into Units of Learning with Learning Outcomes, suggested delivery methods, learning resources, and methods of assessing the trainee’s achievement. In addition, the units of learning have been grouped in modules to concretize the skills acquisition process and streamline upskilling.

I am grateful to all expert trainers and everyone who played a role in translating the Occupational Standards into this competency-based modular curriculum.

# ACKNOWLEDGMENT

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

I recognize with appreciation the role of the Agriculture National Sector Skills Committee (NSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Agriculture sector for their valuable input and everyone who participated in developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that individuals aspiring to work in the Agriculture Sector acquire competencies to perform their work more efficiently and effectively.

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ABBREVIATIONS AND ACRONYMS

APIHE Apiculture – Hives and Equipment

CC Core Competency

CDACC Curriculum Development Assessment and Certification Council

CU Curriculum

CR Core unit

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

TVETA Technical and Vocational Education and Training Authority

**KEY TO ISCED UNIT CODE**



# COURSE OVERVIEW

The bee hives and bee equipment construction level 3qualification consists of competencies an individual must have to construct bee hives and bee equipment and fabricate bee hives and bee equipment within the institution’s/organizations acceptable standard operating procedures (SOPs).

Units of learning comprising of Bee hive and Bee equipment construction level 3 qualification include the following:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UNIT CATEGORY** | **Unit Code** | **Units Title** | **Unit Duration (Hours)** | **Credit Factor** |
| CORE | 0214 351 01A | Construct bee hive and bee equipment | 180 | 18 |
| CORE | 0214 351 02A | Fabricate bee equipment accessories | 120 | 12 |
|  | **Industry Training** | | 320 | 32 |
|  | **GRAND TOTAL** | | **620** | **62** |

**Entry Requirements**

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

1. Kenya Certificate of Primary Education (KCSE)

**Or**

b) Equivalent qualifications as shall be guided by relevant regulatory body

**Trainer Qualification**

Qualifications of a trainer for this course include:

1. Possession of at least level 5 in related trade area;
2. License by TVETA

**Industry Training**

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 320 hours in the agriculture sector. The industrial training may be taken after completion of all units for those pursuing the full qualification or be distributed equally in each unit for those pursuing partial qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy.

**Assessment**

The course shall be assessed formatively and summatively:

1. During formative assessment all performance criteria shall be assessed based on performance criteria weighting.
2. Number of formative assessments shall minimally be equal to the number of elements in a unit of competency
3. Assessment of basic and common competencies shall be integrated in the core units
4. Theoretical assessment shall be integrated in practical assessment and conducted orally in both formative and summative assessments.
5. Theoretical and practical weight shall be 10:90 respectively for each unit of learning.
6. Formative and summative assessments shall be weighted at 60% and 40% respectively in the overall unit of learning score
7. Assessment performance rating for each unit of competency shall be as follows:

|  |  |
| --- | --- |
| **MARKS** | **COMPETENCE RATING** |
| 80 -100 | Attained Mastery |
| 65 - 79 | Proficient |
| 50 - 64 | Competent |
| 49 and below | Not Yet Competent |
| Y | Assessment Malpractice/irregularities |

1. Assessment for Recognition of Prior Learning (RPL) may lead to award of part and/or full qualification.

**Certification**

A candidate will be issued with a Certificate of Competency upon demonstration of competence in a Unit of Competency. To be issued with the Kenya National TVET Certificate in Bee Hives and Bee Equipment Construction level 3, the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. Statement of Attainment certificate may be awarded upon demonstration of competence in certifiable element within a unit.

These certificates will be issued by Qualification Awarding Institution.

# BEE HIVES AND BEE EQUIPMENT CONSTRUCTION

**UNIT CODE:** 0214 251 01A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: construct bee hives and bee equipment

**Duration of Unit:** 180hours

**Unit Description**

This unit specifies the competencies required to construct bee hives. It involves preparing to construct bee hives, constructing Kenya Top Bar Hive, Langstroth Hive, catcher box, observation hive and post construction of hives and catcher box and observation hives

**Summary of learning outcomes**

By the end of this unit of learning, the trainee should be able to:

|  |  |  |
| --- | --- | --- |
| **S/No** | **Learning Outcomes** | **Duration (Hours)** |
| 1. | Prepare to construct bee hives | 20 |
| 2. | Construct Kenya Top Bar Hive | 30 |
| 3. | Construct Langstroth Hive | 30 |
| 4. | Construct catcher box | 30 |
| 5. | Construct observation hive | 30 |
| 6. | Post construction of hives and catcher box | 20 |
| 7. | Perform Digital record Keeping | 20 |
| **Total** | | **180** |

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

| **Learning Outcome** | **Content** | **Methods of assessment** |
| --- | --- | --- |
| 1. Prepare to construct bee hives | * 1. 1.1 Types of bee hives   1.2 Identification of materials and equipment for constructionof bee hives  1.3 Personal protective equipment in bee hive construction | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Construct Kenya Top Bar Hive | 2.1 Identification of materials and equipment for construction of Kenya Top Bar Hive  2.2 Assembling materials and equipment for construction  2.3 Procedure for seasoning timber  2.4 Procedure for plaining timber to the recommended thickness   * 1. Components of the Kenya Top Bar Hive   2.6 Procedure for taking measurements for construction of the Kenya Top Bar Hive   * 1. Procedure for cutting timber   2. Construction of different hive components   3. Drilling bee entrances holes   4. Assembling various components   5. Fixing Hive hanging wires   6. PPE | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Construct Langstroth Hive | 3.1 Identification of Materials and equipment for construction of the Langstroth Hive   * 1. Assembling of Materials and equipment for construction of the Langstroth Hive   2. Procedure for seasoning timber   3. Procedure for plaining timber to the recommended thickness   4. Components of the Langstroth Hive   5. Procedure for taking measurements for construction of the Langstroth Hive   6. Procedure for cutting timber   7. Construction of different Langstroth hive components   8. Making bee entrances   9. Assembling various Langstroth Hive components | * + Written test   + Observation   + Third party report   + Oral questioning   + Interviews |
| 1. Construct catcher box | * 1. Types of catcher box(Kenya top bar/langstroth)   2. Identification of materials and equipment for construction of the catcher box   3. Assembling materials and equipment for construction of the catcher box   Procedure for seasoning timber   * 1. Procedure for plaining timber to the recommended thickness   4.5 Components of the catcher box   * 1. Procedure for taking measurements for construction of the catcher box   2. Procedure for cutting timber   Construction of different catcher box components   * 1. Drilling bee entrances holes   2. Assembling various catcher box components   3. Fixing catcher box hanging wires | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Construct observation hive | * 1. Identification of Materials and equipment for construction of the observation hive   2. Assembling of Materials and equipment for construction of the observation hive   3. Procedure for seasoning timber   4. Procedure for plaining timber to the recommended thickness   5. Components of the observation hive   6. Procedure for taking measurements for construction of the observation hive   7. Procedure for cutting timber   8. Construction of different observation hive components   9. Making bee entrances/holes   10. Assembling various observation hive components | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Post construction of hives and catcher box | * 1. Types of baits   6.1.1 Baiting methods   * + 1. Materials for baiting     2. Procedure for baiting   1. Storage of hives and bee equipment   2. Management and disposal of waste | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 7. Perform Digital record keeping | * 1. Meaning and Importance of Word Processing      1. Creating word documents      2. Editing word documents      3. Formatting word documents      4. Save word documents      5. Printing word documents   2. Observation of netiquette principles   3. Performance of internet search   4. Execution of electronic mail communication | * Observation * Oral assessment * Portfolio of evidence * Third party report * Written assessment * Project * Practical |

**Suggested Methods of instructions**

* Projects
* Demonstration by trainer
* Practice by the trainee
* Discussions
* Direct instruction
* Instructor-led facilitation
* Demonstration by trainer
* Practical work by trainees
* Viewing of related videos
* Group discussions
* Projects
* Case studies
* Role play

**Recommended Resources**

|  |  |  |
| --- | --- | --- |
| **General Resources** | **Tools and Equipment** | **Materials and Supplies** |
| * 25 Desktop computers/laptops | 25 mobile phones | Flashcards |
| * Internet connection | Telephone | Flip charts |
| * 1 Projector * 1 Printer |  | 2 packets of assorted colors of whiteboard marker pens |
| * 1 Whiteboard |  | Printing papers |
| * 1 Overhead projectors * Internet * Video clips * Timber * Flat metal bar * Iron sheets * Galvanized aluminum sheets and wire * Cotton material * Goose net * Coffee wire | * File for sharpening * hammers * Wood plainer * Joinery equipment * Tape measure * Drilling machine * Pliers * Sewing machine * Tailoring scissors * Tin snip * PPE * Feeder box * Queen excluder | * 25 sets of Writing materials Stationery * Charts * Baiting material * Wood glue * Paint * Leather/Rexene gloves * Zips and elastic material   Nails, |

# BEE EQUIPMENT ACCESSORIES FABRICATION

**UNIT CODE:** 0214 251 02A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Fabricate bee equipment accessories

**Duration of Unit:** 120hours

**Unit Description**

This unit specifies the competencies required to fabricate bee equipment accessories (smoker, hive tool, bee brush, feeder box). It involves preparing to fabricate a bee smoker, fabricating the smoker, a hive tool, constructing bee brush and conducting post-construction activities and bee equipment

|  |  |  |
| --- | --- | --- |
| **S/No** | **Learning Outcomes** | **Duration (Hours)** |
| 1. | Prepare to fabricate a bee smoker | 20 |
| 2. | Fabricate the smoker | 20 |
| 3. | Fabricate a hive tool | 20 |
| 4. | Construct bee brush | 20 |
| 5. | Conduct post-construction activities and bee equipment | 20 |
| 6. | Maintain Ethical Work Practices and Values | 20 |
| **Total** | | **120** |

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

| **Learning Outcome** | **Content** | **Methods of assessment** |
| --- | --- | --- |
| 1. Prepare to fabricate a bee smoker | * 1. 1.1 Identification and assembling of materials and equipment for fabricating a smoker   2. Components of a smoker   3. Personal protective equipment in fabricating a bee smoker | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Fabricate the smoker | * 1. Assembling materials and equipment for fabricating a bee smoker   2. Measuring, cutting, shaping and making the nozzle   3. Measuring, cutting, shaping and making the barrel   4. Fixing the bottom of the barrel and smoothening the edges   5. Measuring and cutting the material for the smoker pump   6. Fixing the pump spring and leather/rexin material   7. Assembling the smoker components and fixing the handle   8. Smoothening all the sharp/rough edges   9. Evaluation of the quality of the bee smoker | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Fabricate a hive tool | * 1. Types of hive tools   2. Assembling materials and equipment for making the hive tool   3. Measuring and cutting the material to size   4. Curving one end   5. Sharpening of both ends   6. Smoothening and painting   7. Evaluation of the quality of the fabricated hive tool | * + Written test   + Observation   + Third party report   + Oral questioning   + Interviews |
| 1. Construct bee brush | 4.1Identification and assembling of materials and equipment for making a bee brush   * 1. Cutting of sisal fibres into the recommended length   4.3 Types of timber to be used in making bee brush handles  Cutting of timber handle  4.4 Fixing fibres onto the handle  4.5 Trimming sisal fibres to the desired length  Evaluation of the quality of the bee brush | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Conduct post-construction activities and bee equipment | * 1. Storage of fabricated bee hives and bee equipment   2. Management and disposal of waste in fabrication | * Written test * Observation * Third party report * Oral questioning * Interviews |
| 1. Maintain Ethical Work Practices and Values | * 1. Personal Management   2. Observation of policies and guidelines   3. Exercise of self-worth and professionalism   4. Observation of code of conduct   5. Team work application   6. Conflict resolvation   7. Development of creativity, innovative and practical solutions   8. Analyzation of customer concerns and complaints | * Observation * oral assessment * Written assessment * Third-party reports * Portfolio of Evidence * Practical assessment |

**Suggested Methods of instructions**

* Projects
* Demonstration by trainer
* Practice by the trainee
* Discussions
* Direct instruction

**Recommended Resources for 25 trainees**

|  |  |  |
| --- | --- | --- |
| **General Resources** | **Tools and Equipment** | **Materials and Supplies** |
| Cotton material | Pliers | PPE |
| Goose net | Drilling machine | Nails |
| Coffee wire | Tape measure | Leather/Rexene gloves |
| Galvanized aluminum sheets and wire | Wood plainer |  |
| Timber | File for sharpening |  |
| Flat metal bar | Flat metal bar |  |
| Iron sheets (as per number and size of bee hives) | Tailoring scissors |  |
| Bee escape board | Tin snip |  |
| 10 Steam wax extractor | Sewing machine |  |
| 25 Pollen trap | hammers |  |
| 5 Catcher box | Joinery equipment |  |
| 5 Wood glue | Hive tools |  |
| 25 Bee brush |  |  |
| 25 Honey strainers |  |  |
| Fiber materials |  |  |
| 10 Solar wax extractors |  |  |
| 5 Observation hive |  |  |
| 10 Honey press |  |  |
| Zips and elastic material |  |  |
| Smokers |  |  |
| Honey extractors |  |  |
| 25 Desktop computers/laptops | 25 mobile phones | Flashcards |
| Internet connection | Telephone | Flip charts |
| 1 Projector  1 Printer |  | 2 packets of assorted colors of whiteboard marker pens |
| 1 Whiteboard |  | Printing papers |
| 5 Business plan templates  1 Overhead projectors  Internet |  | * 25 sets of Writing materials Stationery * Charts |

**Suggested Methods of Instruction**

* Assignments
* Brainstorming
* Case studies
* Demonstration
* Direct instruction with active learning strategies
* Experiential
* Field trips
* Group Discussion
* Guest speakers
* Instructor lead facilitation of theory using active learning strategies.
* Practice assignment
* Presentations
* Problem-solving
* Question and answer
* Roleplay
* Simulation/Roleplay
* Team training