

**REPUBLIC OF KENYA**

**COMPETENCY- BASED MODULAR CURRICULUM**

**FOR**

**AQUACULTURE**

**KNQF LEVEL 5**

**PROGRAMME ISCED CODE: 0831 454A**

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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 Fisheries 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 up skilling.

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 National Fisheries Sector Skills Committee (NFSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Fisheries 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 Fisheries Sector acquire competencies to perform their work more efficiently and effectively.

# ABBREVIATIONS AND ACRONYMS

PPEs Personal Protective Equipment

ISCED International Standard Classification of Education

TVET Technical and Vocational Education and Training

TVETA Technical and Vocational Education and Training Authority

CBET Competency Based Education and Training

**KEY TO ISCED UNIT CODE**

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# COURSE OVERVIEW

Aquaculture Level 5 curriculum consists of competencies that an individual must have to carry out aquaculture production. It involves aquaculture housing activities, production of table size fish, hatchery operations, fish feed production aquaculture operation, ornamental fish production, principles of farm management, fish post-harvest operation and principles of agricultural marketing.

Units of learning comprising Aquaculture level 5 Qualification include the following:

**SUMMARY OF UNITS OF COMPETENCY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit code** | **Unit title** | **Unit Category** | **Duration (Hours)** | **Credit factor** |
| **MODULE I** | | | | |
| 0831 451 01A | Aquaculture housing activities | CORE | 150 | 15 |
| 0831 451 02A | Production of table size fish. | CORE | 150 | 15 |
| 0611 451 01 A | Digital literacy | BASIC | 40 | 4 |
| 0031 451 02A | Communication skills | BASIC | 40 | 4 |
|  | **TOTAL** |  | **380** | **38** |
| **MODULE II** | | | | |
| 0223 451 03A | Work Ethics and Practices | BASIC | 40 | 4 |
| 0831 451 03A | Fish hatchery operations | CORE | 180 | 18 |
| 0831 451 04A | Fish feed production | CORE | 180 | 18 |
| **TOTAL** | |  | **400** | **40** |
| **MODULE III** | | | | |
| 0417 451 04 A | Entrepreneurial skills | BASIC | 40 | 4 |
| 0831 451 05A | Aquaculture Operations | CORE | 180 | 18 |
| 0831 451 06A | Ornamental fish production | CORE | 180 | 18 |
| **TOTAL HOURS** | |  | **400** | **40** |
| **MODULE IV** | | | | |
| 0811 451 07A | Principles of farm management | CORE | 100 | 10 |
| 0831 451 08A | Fish Post Harvest Operation | CORE | 180 | 18 |
| 0811 451 09A | Principles of agricultural marketing | CORE | 180 | 18 |
| **Sub total** |  |  | **460** | **54** |
|  | Industrial Attachment |  | **480** | **48** |
| **Grand total** | |  | **2120** | **212** |

**Entry Requirements**

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

1. Kenya Certificate of Secondary Education (KCSE) mean grade D

**Or**

1. Certificate in Aquaculture or related course Level 4

or

1. Equivalent as determined by TVET Authority

**Trainer Qualification**

A trainer for any of the units of competency in this course must:

1. A trainer for this course must have at least a level 6 in aquaculture, or any other related qualification.
2. Licensed by TVETA.

**Industrial training**

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 480 hours in the fisheries 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 part qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy

**Assessment Requirements**

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. During summative assessment basic and common units may be integrated in the core units or assessed as discrete units.
4. Theoretical and practical weighting for each unit of learning shall be as follows:
5. 10-90 for units in module I and II
6. 30-70 for units in module III and module IV
7. Formative and summative assessments shall be weighted at 60% and 40% respectively in the overall unit of learning score

For a candidate to be declared competent in a unit of competency, the candidate must meet the following conditions:

1. Obtained at least 40% in theory assessment in formative and summative assessments.
2. Obtained at least 60% in practical assessment in formative and summative assessment where applicable.
3. Obtained at least 50% in the weighted results between formative assessment and summative assessment where the former constitutes 60% and the latter 40% of the overall score.
4. 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 core Unit of Competency. To be issued with Kenya National TVET Certificate in Aquaculture level 5, the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. A Statement of Attainment certificate may be issued upon demonstration of competence in a certifiable element within a unit.

The certificates will be issued by the Qualification Awarding Institution

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# MODULE I

## AQUACULTURE HOUSING ACTIVITIES

**UNIT CODE: 0831 451 01A**

**UNIT DURATION: 150 HOURS**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Perform Aquaculture housing activities

**UNIT DESCRIPTION**

This unit specifies the competencies required to set up fish rearing unit. It involves applying farm management concepts, constructing fish rearing units, installing inlet and outlet systems, predatory control devices and maintaining fish rearing units.

**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. | Construct a fish-rearing unit | 40 |
| 2. | Install inlet and outlet systems | 40 |
| 3. | Install predatory control devices | 40 |
| 4. | Maintain fish rearing unit | 30 |
| **Total** | | **150** |

**ELEMENT AND PERFORMANCE CRITERIA**

|  |  |  |
| --- | --- | --- |
| **LEARNING OUTCOME** | **CONTENT** | **SUGGESTED METHOD OF ASSEMENT** |
| 1. Construct a fish-rearing unit | * 1. Personal protective equipment      + Gumboots      + Helmets      + Gloves      + Overalls      + First aid kits   2. Tools and requirements      + Tools-tape measure      + Spirit level      + Jembes      + Spades      + Pangas   3. Factors to consider before constructing a rearing unit   + Availability of extra labor   + Equipment and materials required   + Site related factors   1. Site clearing   + Importance of site clearing   + Types of wetland vegetation   + Site clearing techniques   + Risks associated with site clearing   1. Methods of disposing cleared vegetation   2. Analyzation of water quality and quantity   3. Analyzation of water characteristics   4. Land topography   5. Selection of fish   rearing unit   * + - Earthen ponds     - Lined ponds     - Concrete ponds     - Fiberglass tanks     - Plastic tanks     - Glass tanks   1. Clearance of fish rearing unit   2. Measurement of fish rearing area   3. Construction of fish rearing unit   4. Pond levelling and inlet outlet system | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Install inlet and outlet systems | * 1. Personal protective equipment   2. Tools and equipment selection   3. Elevation of inlet and outlet system   4. Excavation of trenches   5. Installation of PVC pipes   6. Fitting of inlets and outlets   7. Backfilling of trenches   8. Inlet and outlet systems * Pipe inlets * Open gutter inlets * Canal inlets * Gate valves * Canfield pipes * Sluices * Monks | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Install predatory control devices | * 1. Measurement of fish rearing unit   2. Pegging of fish rearing unit   3. Mounting of predatory control devices      + Chain link      + Scare crow      + Decoys      + Deterrents      + Electric fencing | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Maintain fish rearing unit | * 1. Maintenance required in fish rearing unit   4.2 Cleaning around net pens and ponds   * + - Repairing damaged netting     - Floatation or moorings     - fixing the banks of a pond   1. fish rearing unit maintenance procedure   2. Recording of identified issues   3. Cleaning of tools and equipments | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category/Item** | **Description/specification** | **Quantity** | **Recommended ratio**  **(item: Trainee)** |
| Desktop computers/laptops |  | 25 | 1:1 |
| Internet connection |  |  |  |
| Projector  Printer |  | 1  1 | 1:25  1:25 |
| Feed mixer |  | 1 | 1:25 |
| Well-equipped workshop |  | 1 | 1:25 |
| Flame photometer |  | 1 | 1:25 |
| Tanks |  | 1 | 1:25 |
| Feed extruder |  | 1 | 1:25 |
| Assorted sieve |  | 1 | 1:25 |
| Spade |  | 5 | 1:5 |
| Weighing scale |  | 5 | 1:5 |
| Jembe |  | 5 | 1:5 |
| PH meter |  | 5 | 1:5 |
| Wheelbarrow |  | 5 | 1:5 |
| Measuring tape |  | 5 | 1:5 |

## PRODUCTION OF TABLE SIZE FISH

## UNIT CODE: 0831 451 02A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: produce table size fish

**Unit duration: 150 Hours**

**Unit Description**

This unit covers the competencies required to produce table-size fish. It entails preparing grow-out rearing units, stocking fingerlings and managing fish health.

**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 grow-out rearing units | 40 |
| 2. | Stock fingerlings | 40 |
| 3. | Feed grow out fish | 40 |
| 4. | Manage fish health. | 30 |
| **Total** | | **150** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Prepare grow-out rearing units | **Theory**   * 1. PPEs      1. Safety goggles      2. Gumboots      3. Gloves      4. Dust coats      5. First aid kits      6. Gas mask      7. Waders   2. Selection of tools and equipment      1. Weighing scale      2. Wheelbarrow      3. Water quality test kit      4. Spades      5. Lime      6. Fertilizer      7. Secchi disks      8. Microscope      9. Dissecting kit      10. Buckets and basins      11. Fish harvesting gear   3. Disinfecting grow-out rearing unit   4. Filling if fish rearing unit   5. Carrying out Grow-out rearing unit water conditioning      1. Liming      2. Fertilization      3. Flocculation      4. Flushing   1.6 Fertilization and liming of culture units | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Stock fingerlings | **Theory**   * 1. PPEs      1. Safety goggles      2. Gumboots      3. Gloves      4. Dust coats      5. First aid kits      6. Gas mask      7. Waders   2. Selection of tools and equipment   3. Fingerlings selection * Care and handling of fingerlings * Fingerling transportation methods * Factors to consider when stocking ponds with fingerlings   + Timing   + Weather   + Water quality   + Fingerling acclimatization   + Stocking procedure      * 1. Fingerlings transfer   2. Carry out fingerlings stocking   3. Post-harvest monitoring of stocked fish   + Handling fingerling mortalities   1. Signs of stress in newly stocked fish | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Feed grow out fish | 3.1 Types of fish feeds  Natural feeds   * 1. Pond liming and fertilization   2. Fish feeding methods      1. Hand feeding (broadcasting)      2. Automatic feeders      3. Demand feeders   3. Fish feeding behavior   4. Feeding rates, frequency and timing   5. On-farm feed handling and storage   6. Maintenance of basic feeding records | * Oral questioning * Written tests * Practical tests |
| 1. Manage fish health. | * 1. PPEs   2. Selection of tools and equipment   3. Fish health signs and symptoms   4. Administration of disinfectants, drugs, therapeutic substances and antibiotics      1. Iodophores      2. Chlorine      3. Formalin      4. Ozonation      5. Quaternary ammonium compounds      6. Hydrogen Peroxide      7. Potassium permanganate      8. Copper Sulfate      9. Emamectin benzoate      10. Florfenicol      11. Oxolinic acid and flumequine      12. Oxytetracycline   5. Carrying out prevention and control of fish diseases      1. Pathogen-free water      2. Transfer of pathogens      3. Disinfections      4. Optimization of environmental conditions | * Practical * Project * Third party report * Portfolio of evidence * Written tests   + Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended resources for 25 trainees.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
|  | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with table fish production books and E- section | 1 | 1:25 |

**DIGITAL LITERACY**

**UNIT CODE: 0611 451 01A**

**DURATION OF UNIT: 40 HOURS**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Digital Literacy**

**Unit Description**

This unit covers the competencies required to demonstrate digital literacy. It involves operating computer devices, solving tasks using the Office suite, accessing online/offline data and information, performing online communication and collaboration, applying cybersecurity skills and performing jobs online. It also involves applying job entry techniques.

**Summary of Learning Outcomes**

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

|  |  |  |
| --- | --- | --- |
| **S/No** | **Learning Outcomes** | **Duration (Hours)** |
|  | Operate computer devices | 6 |
|  | Solve task using office suite | 14 |
|  | Manage data and information | 6 |
|  | Apply cyber security skills | 4 |
|  | Online collaboration and communication | 4 |
|  | Perform online jobs | 4 |
|  | Apply job entry techniques | 2 |
| **Total** | | **40** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Operate computer devices | **Theory**   * 1. Computer devices      1. Definition of terms         1. Digital literacy         2. Computer systems         3. Information communication technology (ICT)      2. Importance of Information and Communication Technology      3. Functions and uses of computers      4. History of computers      5. Classifications of computers      6. Components of computer system      7. Computer Hardware         1. System unit         2. Input devices         3. Output devices         4. Storage Devices         5. Computer ports      8. Computer software         1. Classifications of computer software.         2. Operating system functions      9. Booting a computer      10. Mouse use techniques      11. Keyboard parts and uses techniques      12. Desktop customization      13. Files and folders management using operating system      14. Computer internet connection          1. Mobile networks/data plans          2. Wireless hotspots          3. Cabled (Ethernet/fibre)          4. Dial-Up          5. Satellite      15. Computer external devices          1. Device connections          2. Device controls (volume controls and Display properties)   **Practice**   * 1. Identify, assemble and connect the computer components listed in 1.1.7.      1. Computer hardware         1. System unit         2. Input devices         3. Output devices         4. Storage devices      2. Boot a computer according to booting standards/procedures      3. Customize desktop      4. Manage files and folders | * Written assessment * Practical assessment * Interviews/ Oral questions |
| 1. Solve tasks using office suite | * 1. Microsoft Office Suite      1. Word processing concepts         1. Examples of Word processing         2. Importance of Word processing      2. Working with word documents         1. Opening and closing word processor Create a new document         2. Save a document         3. Switch between open documents      3. Microsoft word screen layout         1. Set basic options/preferences         2. Help resources         3. Use of magnification/zoom tools         4. Display, hide built in tool bar         5. Using navigation tools      4. Creating word document         1. Editing a document         2. Formatting a document         3. Formatting text         4. Formatting paragraphs         5. Formatting page/document      5. Creating and editing tables         1. Editing of tables      6. Formatting tables         1. Border and shadings         2. Adjusting column width and row heights         3. Changing text direction      7. Inserting graphical objects         1. Edit and format an object      8. Mail merging      9. Document print set up         1. Print preview         2. Page layout         3. Paper size         4. Orientation      10. Printing a document   2. Spreadsheets concepts      1. Electronic spreadsheets      2. Importance of electronic spreadsheets      3. Components of spreadsheets      4. Applications areas of spreadsheets      5. Creating worksheets using Microsoft Excel         1. Parts of MS Excel Window         2. Cell data types         3. Cell referencing         4. Block operations         5. Arithmetic operators      6. Data manipulation         1. Basic functions and formulae         2. Database functionalities            1. Sorting data            2. Filtering data            3. Sub-totals      7. Editing a worksheet      8. Formatting a worksheet      9. Visual representation using charts      10. Worksheet printing   3. Electronic presentations      1. Meaning and importance of electronic presentations      2. Examples of an electronic presentations      3. Application areas of electronic presentation.      4. Creating presentations using Microsoft PowerPoint         1. Parts of MS PowerPoint Window         2. Open and close presentation         3. Creating slides         4. Text management         5. Use of magnification tools         6. Switch between open presentations      5. Developing a presentation         1. Presentation views         2. Slides         3. Master slide      6. Text         1. Editing text         2. Formatting text      7. Charts         1. Using charts         2. Organizational charts      8. Graphical objects         1. Insert, and manipulate object         2. Insert tables         3. Draw an object      9. Outputs preparation         1. Apply slides effects and transitions         2. Check and deliver         3. Spell check a presentation         4. Slide orientation         5. Slide shows navigation      10. Print presentations (slides and handouts)  1. **Practice**     1. Create Word document,       1. Insert header and footer       2. Apply document editing techniques       3. Apply formatting tools       4. Format page       5. Insert tables, graphical objects and charts.       6. Save the changes to be printed out later.    2. Create a workbook in Microsoft Excel       1. Use basic formulae and functions to perform calculations       2. Use editing tools such as deleting entries, insert row and columns, copying, moving, finding, replace and spell checking       3. Format the worksheet       4. Generate charts       5. Save and print Workbook    3. Create PowerPoint presentation slides       1. Edit and format texts and paragraphs       2. Insert objects, images, shapes and charts       3. Apply predefined PowerPoint theme       4. Add slide animations and transition effects       5. Deliver presentations | * Written assessment * Practical assessment * Oral assessment * Project |
| 1. Manage data and information | **Theory**   1. Data and Information    * 1. Definition of terms      2. Importance and uses of data and information      3. Computer networks         1. Meaning and types of computer networks      4. Meaning of internet         1. Internet connectivity requirements         2. Internet Service Providers      5. Types of internet services         1. Communication services         2. Information services         3. File transfer         4. Worldwide webs services         5. E –commerce         6. Newsgroup      6. Types Internet access applications         1. Email Client         2. Web browser         3. Internet of things         4. Internet Protocol      7. Web browsing concepts         1. Key concepts         2. Security and safety      8. Web browsing         1. Using web browser         2. Tools and settings         3. Clearing cache and cookies         4. Uniform Resource Locator         5. Bookmarks         6. Web outputs      9. Web based search         1. Search         2. Critical evaluation of information         3. Copyright, data protection      10. Downloads Management      11. Performing Digital Data      12. Backup (Online and Offline)      13. Emerging issues in internet   **Practice**   * 1. Establish an internet connection      1. Open a web browser application allow/block cookie      2. Add bookmarks/ favourites      3. Download files to a location      4. Copy URLs from a web page to another   2. Use search engine to find information | * Written assessment * Oral assessment * Practical assessment |
| 1. Perform online communication and collaboration | **Theory**   * 1. Communication and collaboration      1. Netiquette principles      2. Communication concepts         1. Online communities         2. Communication tools      3. Email concepts         1. importance of effective email         2. email types and their purposes (personal, professional)      4. Electronic Mail         1. Sending E-mail         2. Receiving E-mail         3. Tools and settings         4. Organizing E-mail      5. Digital content copyright and licenses      6. Online collaboration tools         1. Benefits and challenges of online collaboration tools         2. Online storage and productivity            1. Google Drive            2. Dropbox            3. iCloud Drive         3. Online meetings         4. Online learning environment         5. Online calendars (google calendars)         6. Social networks (Facebook/Twitter/setting)      7. Preparation for online collaboration         1. Common set up feature         2. set up      8. Mobile collaboration         1. Key concepts         2. Mobile devices  1. 4.1.7.2 Key types of Mobile Devices    * + 1. Applications        2. Synchronization           1. key aspects of synchronization   **Practice**   * 1. Participate in online communities   2. Download software to support online collaboration tools   3. Upload, download, delete online files/folders   4. Create and send an E-mail   5. Set up an online meeting, share the agenda, and follow up afterward.   6. Share files in an online meeting   7. Install an application on a mobile device   8. Synchronize mobile devices with mail, calendar, other devices |  |
| 1. Apply cybersecurity skills | **Theory**   * 1. Data protection and privacy      1. Introduction to cybersecurity      2. Data security core principles         1. Data confidentiality         2. data integrity         3. data availability      3. Internet security threats         1. malware attacks         2. phishing and social engineering         3. distributed and denial of service         4. password attacks         5. Man-in –the –Middle attack (MitM)         6. Cloud and Internet of Things attacks      4. Computer threats and crimes         1. Environmental threats to computers and information systems         2. Physical threats to computer            1. Theft of hardware            2. Hardware failure            3. Unauthorized access to physical components of a computer system            4. Power surges and outages      5. Computer crimes         1. Types of computer crimes         2. Detection and protection against computer crimes      6. Cybersecurity control measures         1. Physical controls         2. Technical/logical (passwords, pins, biometrics)         3. Operational controls      7. Policies and Laws governing protection of ICT in Kenya         1. The computer Misuse and Cybercrimes Act No.5 of 2018         2. The Data Protection Act No. 24 of 2019   **Practice**   * 1. Create password and biometrics to prevent unauthorized access   2. Use Anti-virus   3. Apply file security   4. Backup data | * Written assessment * Oral assessment * Practical assessment |
| 1. Perform online jobs | **Theory**   1. Online jobs    * 1. Types of online jobs      2. Online job platforms         1. Remotask         2. Cloud worker         3. Data annotation tech         4. Freelance         5. Indeed         6. Oneforma         7. Appen      3. Online account and profile management         1. Types of online accounts and profiles         2. Creating online accounts         3. Managing profiles      4. Online job bidding identification         1. Benefits of online biding         2. Examples of online bidding      5. Online digital identity      6. Executing online task         1. Executing online task effectively      7. Management of online payment accounts         1. Types of online payment accounts         2. Online payment process         3. Steps for effective management   **Practice**   * 1. Search online jobs platforms   2. Create an online account      1. Setup profile      2. Identify online job bidding      3. Create new project | * Written assessment * Oral assessment * Practical assessment * Project |
| 1. Apply job entry techniques | **Theory**   * 1. Job Entry Techniques      1. Types of job opportunities         1. Self-employment         2. Salaried employment         3. Service provision         4. Product development      2. Sources of job opportunities (websites      3. Functional writings         1. Resumes/CV building with word processing tools         2. Crafting effective Cover letters      4. Digital portfolios         1. Academic credentials         2. References and testimonials            1. letter of commendations         3. Certification participations         4. Awards and decorations      5. Interview skills         1. Introduction to interview            1. Virtual interviews            2. Phone interviews            3. Recorded video responses         2. Preparing for virtual interview            1. Setting up your space (quiet environment, background, lighting)            2. Technical readiness (internet connection, camera, microphone)         3. Professional presence on camera            1. Body language (posture, eye contact)            2. Clear and confident communication            3. Grooming for a virtual environment         4. Digital etiquette for virtual interviews            1. Time management (logging in early and checking connections)            2. Muting/unmuting appropriately            3. Handling technical issues            4. Using chat features for technical issues            5. Closing the interview/meeting (thank the interviewer and log out promptly)   **Practice**   * 1. Create a resume and cover letters   2. Using a platform Google site build a portfolio that highlights projects, skills, and accomplishments | * Written Assessment * Practical assessment * Oral assessment * Portfolio of evidence |

**Suggested Methods of Instruction**

* Demonstration by the trainer
* Practical work by trainees
* Viewing of related videos
* Case study
* Role playing
* Project
* Group discussions
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | Charts |  |  |  |
|  | PowerPoint presentations | For trainer’s use |  |  |
|  | Whiteboard |  | 1 |  |
|  | Assorted color of whiteboard markers |  |  |  |
|  | Printers |  | 2 |  |
|  | External storage media |  |  |  |
|  | Projector |  | 1 |  |
|  | Whiteboard |  | 1 |  |
|  | Smart board/ Smart TV (where applicable) |  |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room | Size?? | 1 | 1:25 |
|  | Projector |  | 1 |  |
|  | Telephone |  |  |  |
|  | samples of CV |  | 5 |  |
|  | Assorted Flash Cards |  | 25 |  |
|  | Site | Size? | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Printing Papers |  |  |  |
|  | Assorted color of whiteboard marker |  |  |  |
| **D** | **Tools and Equipment** |  |  |  |
|  | Desktop computers/laptops with the following software:   1. Windows /Linux/Macintosh Operating System 2. Microsoft Office Software 3. Google Workspace Account 4. Antivirus Software |  | 15 pcs |  |
|  | Internet connection | For trainer’s use |  |  |
|  | Rolls flip charts | For trainer’s use | 1 | 1:1 |
|  | Assorted Flash Cards | For trainer’s use | 1 | 1:1 |
|  | Telephone | For trainer’s use | 1 | 1:1 |

# COMMUNICATION SKILLS

**UNIT CODE: 0031 451 02A**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply Communication Skills

**Duration of Unit:** 40 hours

**Unit Description**

This unit covers the competencies required to apply communication skills. It involves applying communication channels, written, non-verbal, oral, and group communication skills.

**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. | Apply communication channels | 10 |
| 2. | Apply written communication skills | 12 |
| 3. | Apply non-verbal communication skills | 4 |
| 4. | Apply oral communication skills | 4 |
| 5. | Apply group communication skills | 10 |
| **Total** | | **40** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment**  **Methods** |
| 1. Apply  communication channels | * 1. Communication process   2. Principles of effective communication   3. Channels/medium/modes of communication   4. Factors to consider when selecting a channel of communication   5. Barriers to effective communication   6. Flow/patterns of communication  1. Sources of information 2. Organizational policies | * Oral questions * Written assessment * Observation * Portfolio of Evidence * Practical assessment * Third party report |
| 2. Apply written communication skills | * 1. Types of written communication   2. Elements of communication   3. Organization requirements for written communication | * Oral assessment * Written assessment * Observation * Portfolio of Evidence * Practical assessment * Third party report |
| 3. Apply non-verbal communication skills | * 1. Utilize body language and   3.2 Nonverbal communication techniques | * Oral assessment * Written assessment |

|  |  |  |
| --- | --- | --- |
|  | 3.3Apply body posture   * 1. Apply workplace dressing code | * Observation * Portfolio of Evidence * Practical assessment * Third party report |
| 4. Apply oral communication skills | * 1. Types of oral communication pathways   2. Effective questioning techniques   3. Workplace etiquette   4. Active listening | * Oral assessment * Written assessment * Observation * Portfolio of Evidence * Practical assessment * Third party report |
| 5. Apply group discussion skills | * 1. Establishing rapport   2. Facilitating resolution of issues   3. Developing action plans   4. Group organization techniques   5. Turn-taking techniques   6. Conflict resolution techniques   7. Team-work | * Oral assessemnt * Written assessment * Observation * Portfolio of Evidence * Practical assessment |

**Suggested Methods of Instruction**

* + Discussion
  + Roleplaying
  + Simulation
  + Direct instruction
  + Demonstration
  + Field trips

**Recommended Resources for 25 trainees**

|  |  |  |
| --- | --- | --- |
| General Resources | Tools and  Equipment | Materials and Supplies |
| * 25 Desktop computers/laptops | Mobile phones | Flashcards |
| * Internet connection |  | Flip charts |
| * 1 Projector * 1 Printer |  | 2 packets of assorted colors of whiteboard  marker pens |
| * 1 Whiteboard |  | Printing papers |
| * Report writing templates |  |  |

# MODULE II

# WORK ETHICS AND PRACTICES

**UNIT CODE:** 0417 451 03A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply work ethics and practices.

**Duration of Unit:** 40 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves the ability to: conduct self-management, promote ethical work practices and values, promote teamwork, manage workplace conflicts, maintain professional and personal development, apply problem-solving, and promote customer care.

**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. | Apply self-management skills | 10 |
| 2. | Promote ethical work practices and values | 4 |
| 3. | Promote Team work | 10 |
| 4. | Maintain professional and personal development | 10 |
| 5. | Apply Problem solving skills | 4 |
| 6. | Promote Customer Care | 2 |
| **Total** | | **40** |

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

| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| --- | --- | --- |
| 1. Apply Self-Management Skills | 1. Self-awareness 2. Formulating personal vision, mission, and goals 3. Healthy lifestyle practices 4. Strategies for overcoming work challenges 5. Emotional intelligence 6. Coping with Work Stress. 7. Assertiveness versus aggressiveness and passiveness 8. Developing and maintaining high self-esteem 9. Developing and maintaining positive self-image 10. Time management 11. Setting performance targets 12. Monitoring and evaluating performance targets | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Promote Ethical Work Practices And Values | 1. Integrity 2. Core Values, ethics and beliefs 3. Patriotism 4. Professionalism 5. Organizational codes of conduct 6. Industry policies and procedures | * Written assessment * Oral assessment * Third party reports * Portfolio of evidence * Project * Practical |
| 1. Promote Teamwork | 1. Types of teams 2. Team building 3. Individual responsibilities in a team 4. Determination of team roles and objectives 5. Team parameters and relationships 6. Benefits of teamwork 7. Qualities of a team player 8. Leading a team 9. Team performance and evaluation 10. Conflicts and conflict resolution 11. Gender and diversity mainstreaming 12. Developing Healthy workplace relationships 13. Adaptability and flexibility 14. Coaching and mentoring skills | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Maintain Professional and Personal Development | 1. Personal vs professional development and growth 2. Avenues for professional growth 3. Recognizing career advancement 4. Training and career opportunities 5. Assessing training needs 6. Mobilizing training resources 7. Licenses and certifications for professional growth and development 8. Pursuing personal and organizational goals 9. Managing work priorities and commitments 10. Dynamism and on-the-job learning | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Apply Problem-Solving Skills | 1. Causes of problems 2. Methods of solving problems 3. Problem-solving process 4. Decision making 5. Creative thinking and critical thinking process in development of innovative and practical solutions | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Promote Customer Care | 1. Identifying customer needs 2. Qualities of good customer service 3. Customer feedback methods 4. Resolving customer concerns 5. Customer outreach programs 6. Customer retention | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Practical
* Demonstrations
* Project
* Group discussion
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | PowerPoint presentations | For trainer’s use |  |  |
|  | Overhead Projector | LCD | 1 | 1;25 |
|  | Case studies |  | 5 | 1;5 |
|  | Business plan templates |  | 5 | 1:5 |
|  | Newspapers and Handouts |  | 5 | 1:5 |
|  | Business Journals |  | 5 | 1:5 |
|  | Video clips | Assorted | 15 sets | 3:5 |
|  | Audio tapes | Assorted | 15 sets | 3:5 |
|  | Whiteboard |  | 1 | 1;25 |
|  | Rolls flip charts |  | 1 | 1;25 |
|  | Assorted color of whiteboard markers | For trainers Use | 1 | 1:25 |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Printing papers |  |  | 1:5 |
|  | Stationery |  | 25 pcs | 1:1 |
|  | Printing ink cartilages |  |  |  |
|  | Internet |  | 200mbps | - |
| **D** | **Tools and Equipment** |  |  |  |
|  | Computers |  | 5 pcs | 1:5 |
|  | Printer |  | 1 pc | 1:25 |

## FISH HATCHERY OPERATIONS

**UNIT CODE:** **0831 451 03A**

**Relationship to Occupational Standards**

This unit addresses the unit: Operate fish rearing unit.

**Unit duration: 180 hours**

**Unit Description**

This unit covers the competencies required to operate fish hatchery. It involves preparing fish hatchery, stocking brood fish, nursing fry and fingerlings and maintaining hatchery unit.

**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 fish hatchery | 50 |
| 2. | Stock brood fish | 50 |
| 3. | Nurse fry and fingerlings | 40 |
| 4. | Maintain the hatchery | 40 |
| **Total** | | **180** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Prepare fish hatchery | **Theory**   * 1. PPEs  1. Safety goggles 2. Gumboots 3. Wading suit 4. Gloves 5. Dust coats 6. First aid kits 7. Life ring 8. Life jacket    1. Assembling of tools, equipment and materials   **Tools and equipment**   * + 1. pH meters     2. DO meters     3. Multiparameter water test kit     4. Secchi disk     5. Computer     6. Ammonia alarms     7. Automatic titrators   **Materials**   * + 1. Assorted reagents     2. Assorted chemicals     3. Test strips   1. Disinfection of fish hatchery facility   2. Filling of fish rearing unit   3. Carrying out of rearing unit water conditioning * Sedimentation * Filtration * Flocculation * Desalination * Micro-organism control * Heating/cooling * pH Adjustment * Aeration * Degassing   1.6 Setting of water flow in the fish pond | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Stock brood fish | * 1. PPEs are worn   2. Assembling of tools, equipment and materials   3. Grading of brooders   4. Transferring of brood fish   5. Broodstock selection   2.6 Carry out brood fish stocking | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Nurse fry and fingerlings | * 1. PPEs   2. Assembling of tools, equipment and materials   3. Carrying out of fish fry and fingerlings stocking   4. Fish fry and fingerling feeding   5. Fish rearing unit water quality maintenance   6. Fish fry and fingerlings grading based on growth rates   7. Carry out fish fry and fingerlings nursing | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Maintain hatchery rearing units | * 1. Water flow rate regulation   2. Aeration systems regular maintenance   3. Cleaning schedule development   4. Water quality parameter ranges maintenance * Dissolved oxygen * Temperature * pH * Ammonia * Nitrite * Alkalinity * Turbidity   1. Rearing unit repairs   2. Carry out hatchery rearing unit maintenance | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended resources for 25 trainees.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
|  | Projector | EPSON | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Hatchery | operational | 1 | 1:25 |
|  | Feed production manual | Up to date | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with fish production books and E- section | 1 | 1:25 |

## PRODUCTION OF FISH FEEDS

**UNIT CODE:** **0831 451 04A**

**RELATIONSHIP TO OCCUPATIONAL STANDARDS**

This unit addresses the unit of competency: produce fish feeds

**Unit duration: 180 Hours**

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce fish feeds. It involves culturing live feed; preparing formulated fish feed; administering live fish feeds and administer formulated fish feeds.

**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. | Culture natural fish feeds | 40 |
| 2. | Produce on-farm formulated fish feeds | 30 |
| 3. | Package and store fish feeds | 40 |
| 4. | Keep records | 40 |
| **Total** | | **150** |

**LEARNING OUTCOMES, CONTENT AND SUGGESTED ASSESSMENT METHODS**

|  |  |  |
| --- | --- | --- |
| **LEARNING OUTCOMES** | **CONTENT** | **SUGGESTED ASSESSMENT METHODS** |
|  |  |  |
| 1. Culture live feeds | * 1. PPEs      1. Gumboots,      2. Helmets,      3. Gloves,      4. Overalls,      5. First aid kits   2. Tools and equipment selection.      1. Feed mixer      2. Feed extruder      3. Tanks      4. Assorted Sieves   3. Preparation of Live fish feeds culture units   4. Inoculation of live fish feeds      1. Daphnia      2. Rotifera      3. Artemia      4. Moina      5. Copepods   5. Monitoring of inoculated organisms   6. Harvesting of live fish feeds   7. Storage of excess Harvested live fish feeds | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 2. Produce on-farm formulated fish feeds | 2.1Assembling of fish feed ingredients.   * + - Cereals and their by-products     - Animal protein sources     - Animal by-product sources     - Plant protein sources     - Minerals     - Feed additives   1. Fish feed Formulation   2. Addition of fish feed additives      + Feed binders      + Antioxidants      + Antibiotics      + Chemo-attractants      + Anabolic agents      + Feed stimulants      + Pigments   3. mixing of formulated fish feeds   4. packaging of formulated fish feeds   2.6 Carry out preparation of formulated fish feeds | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 3.Package and store fish feeds | 3.1 Weighing and packaging of fish feeds  3.2 Storing of dry fish feeds  3.3 Refrigeration of moist fish feeds | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 4. Keep records | * 1. Record of feed ingredients      + Types      + Date procured      + Store quantities   2. Preparation of feeds record   3. Records of food safety parameters maintenance   4. Feeding of produced feeds   5. Monitoring of fish growth rate   4.6 Record keeping of fish growth rate | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended resources for 25 trainees.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
|  | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Feed analysis laboratory | Well equipped | 1 | 1:25 |
|  | Feed quality Journals |  | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with animal nutrition books and E- section | 1 | 1:25 |

# 

# MODULE III

**ENTREPRENEURIAL SKILLS**

**UNIT CODE:** 0413 451 04A

**Relationship to occupational standards**

This unit addresses the unit of competency: Apply Entrepreneurial skills.

**Duration of unit:** 40 hours

**Unit Description:**

This unit covers the competencies required to demonstrate an understanding of entrepreneurship. It involves demonstrating and understanding of financial literacy, applying entrepreneurial concepts identifying entrepreneurship opportunities, applying business legal aspects, and developing business innovative strategies and business plans.

**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. | Apply Financial Literacy Skills | 10 |
| 2. | Apply entrepreneurial concept | 5 |
| 3. | Identify entrepreneurial opportunities | 10 |
| 4. | Apply business legal aspects | 5 |
| 5. | Innovate Business strategies | 5 |
| 6. | Develop Business Plan | 5 |
| **Total** | | **40** |

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

| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| --- | --- | --- |
| 1. Apply Financial Literacy | 1. Personal finance management 2. Balancing between needs and wants 3. Budget Preparation 4. Saving management 5. Factors to consider when deciding where to save 6. Debt management 7. Factors to consider before taking a loan 8. Investment decisions 9. Types of investments 10. Factors to consider when investing money 11. Insurance services 12. insurance products available in the market 13. Insurable risks | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 2.Apply Entrepreneurial Concept | 1. Difference between Entrepreneurs and Business persons 2. Types of entrepreneurs 3. Ways of becoming an entrepreneur 4. Characteristics of Entrepreneurs 5. salaried employment and self-employment 6. Requirements for entry into self-employment 7. Roles of an Entrepreneur in an enterprise 8. Contributions of Entrepreneurship | * Observation * Project * Written assessment * Oral assessment * Third party report |
| 3.Identify Entrepreneurial Opportunities | 1. Sources of business ideas 2. Factors to consider when evaluating business opportunity 3. Business life cycle | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 4.Apply Business Legal Aspects | 1. Forms of business ownership 2. Business registration and licensing processing 3. Types of contracts and agreements 4. Employment laws 5. Taxation laws | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 5.Innovate Business Strategies | 1. Creativity in business 2. Innovative business strategies 3. Entrepreneurial Linkages 4. ICT in business growth and development | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 6.Develop Business Plan | 1. Business description 2. Marketing plan 3. Organizational/Management 4. plan 5. Production/operation plan 6. Financial plan 7. Executive summary 8. Business plan presentation 9. Business idea incubation | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Practical
* Demonstrations
* Project
* Group discussion
* Direct instruction
* Guest speakers

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | PowerPoint presentations | For trainer’s use |  |  |
|  | Overhead Projector | LCD | 1 | 1;25 |
|  | Case studies |  | 5 | 1;5 |
|  | Business plan templates |  | 5 | 1:5 |
|  | Newspapers and Handouts |  | 5 | 1:5 |
|  | Business Journals |  | 5 | 1:5 |
|  | Video clips | Assorted | 25 sets | 1:1 |
|  | Whiteboard |  | 1 | 1;25 |
|  | Rolls flip charts |  | 1 | 1;25 |
|  | Assorted color of whiteboard markers | For trainers Use | 1 | 1:25 |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Printing papers |  |  | 1:5 |
|  | Stationery |  | 25 pcs | 1:1 |
|  | Printing ink cartilages |  |  |  |
|  | Internet |  | 200mbps | - |
| **D** | **Tools and Equipment** |  |  |  |
|  | Computers |  | 5 pcs | 1:5 |
|  | Printer |  | 50 pcs | 2:1 |

## AQUACULTURE OPERATIONS

**UNIT CODE:** **0831 451 05A**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Perform Aquaculture operations

**Unit duration: 180 Hours**

**UNIT DESCRIPTION**

This unit specifies the competencies required to perform aquaculture operations. These include monitoring fish stock, water quality, handling fish stock, feeding fish stock, maintaining Recirculating Aquaculture Systems (RAS), maintaining fish health and managing farm disasters in agricultural production.

**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. | Monitor fish stock | **30** |
| 2. | Monitor water quality | **30** |
| 3. | Handle fish stock | **30** |
| 4. | Feed fish stock | **30** |
| 5. | Maintain Recirculating Aquaculture Systems (RAS) | **30** |
| 6. | Maintain fish health | **30** |
| **Total** | | **180** |

**ELEMENT AND PERFORMANCE CRITERIA**

|  |  |  |
| --- | --- | --- |
| **LEARNING OUTCOME** | **CONTENT** | **SUGGESTED METHOD OF ASSESMENT** |
| 1. Monitor fish stock | * 1. Personal protective equipment * Gloves * Eye production * Lab coat * Rubber boots (steel toe)   1. Risk factors affecting health of stock * Scale loss * Loss of buoyancy balance * Physical injury to mucous membranes Eyes * Gills and fins   1. Checking of monitoring equipment * YSI handheld electronic meter * Doren water sampler * Buckets * Sample jars * Notebook-   1. Checking of house damage * Hatchery tanks * Net Pen * Pond   1. Positioning of monitoring equipment   2. Carrying out monitoring activities   3. Recording of monitoring findings | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Monitor water quality | * 1. Personal protective equipment   2. Tools and equipment   3. Monitoring of water quality parameters * Temperature * Oxygen * Ph * Ammonia * Total nitrogen and phosphorus * Turbidity   1. Application of water treatment | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Handle fish stock | * 1. Selection of tools and equipment   2. Conditions impacting fish stock * Rain * Wind and extreme Heat * Algal Bloom * Increased vessel traffic around net pen   1. Preparation of housing structure   2. Fish seeds selection * Fry * Advanced fry * Fingerlings * Sub-adult fish   1. Stocking of fish seeds   2. Maintenance of fish stock records   3. Mechanisms for storing fish stock data (flash drives, hard drives). from digital literacy | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Feed fish stock | * 1. Personal protective equipment   2. Feeding tools and equipment   3. Fish feed types * Natural * Artificial feeds   1. Feeding of fish * Calculation of FCR * Calculation of feeding rate   1. Removing of uneaten feed   2. Monitoring of fish feeding   3. Storing of fish feed | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Maintain Recirculating Aquaculture Systems (RAS) | * 1. Personal protective equipment   2. Tools and equipment   3. Pumps operation * Submersible * Centrifugal * Diaphragm Pumps   1. Servicing of the pumping system * Inspecting the motor * Lubrication * Replace damaged seals and horses * Mechanical inspection of couplings * Filters * Pump flanges * Checking mounting points status   1. Unclogging of the filtration system   2. Sterilization of filtration water | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Maintain fish health | * 1. Personal protective equipment   2. Tools and equipment   3. Disease signs and symptoms   4. Quarantine of fish stock   5. Recording of abnormal fish stock behavior | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category/Item** | **Description/specification** | **Quantity** | **Recommended ratio**  **(item: Trainee)** |
| Desktop computers/laptops |  | 25 | 1:1 |
| Internet connection |  |  |  |
| Projector  Printer |  | 1  1 | 1:25  1:25 |
| Feed mixer |  | 1 | 1:25 |
| Sample jars |  | 1 | 1:25 |
| Flame photometer |  | 1 | 1:25 |
| Tanks |  | 1 | 1:25 |
| Feed extruder |  | 1 | 1:25 |
| Assorted sieve |  | 1 | 1:25 |
| Spade |  | 5 | 1:5 |
| Weighing scale |  | 5 | 1:5 |
| Doren water sampler |  | 1 | 1:25 |
| Electronic meter |  | 1 | 1:25 |
| Buckets |  | 5 | 1:5 |
| Note book and pens |  | 5 | 1:5 |

## 

## PRODUCTION OF ORNAMENTAL FISH

**UNIT CODE: 0831 451 06A**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce ornamental fish

**Unit duration: 180 Hours**

**Unit Description**

This unit covers the competencies required in the production of ornamental fish. It involves breeding fresh water and marine water ornamental fish, constructing aquarium tanks and carrying out aqua scaping.

**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. | Breed fresh water and marine water ornamental fish | 60 |
| 2. | Construct aquarium tanks | 60 |
| 3. | Carry out aqua scaping | 60 |
| **Total** | | **180** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| * + - 1. Breed fresh water and marine water ornamental fish | **Theory**   * 1. Carrying out selection of ornamental fish brooders * Type Species * Intensity of colour * Reproduction mode * Courtship behaviour * Type of eggs produced   1. Breeding unit water conditioning * Dechlorination * Degassing * Aeration * Temperature stabilization * pH control   1. Ornamental fish brooders pairing   2. Fertilized ornamental fish eggs incubation   3. Ornamental fish hatchlings stocking | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Construct aquarium tanks | * 1. PPEs   2. Selection of tools, materials and equipment * Breeding tanks * Thermostat heaters * Kakabans/Egg trays * Graders * Suction pipes, * Desiccators, * Dechlorinators * Magnetizers * Aquarium lighting * Aquarium filters * Submersible pump   1. Designing of aquaria   2. Cutting of glass sheet for fish aquaria   3. Mounting of cut glass sheets for fish aquaria   4. Test run of constructed aquaria leakages   5. Construct a simple aquarium | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Carry out aqua-scaping. | * 1. PPEs   2. Selection of tools and equipment   3. Aquaria layout design   4. Aqua-scaping materials installation   + Aqua Soils   + Artificial/Natural Aquatic Plants   + Aquarium driftwood   + Aquarium rocks   + Aquarium substrate   + Gravel   + Wall papers   + Aqua-scaping styles implementation   + Dutch   + Jungle   + Iwagumi   + Nature Aquarium   1. Carry out aqua-scaping. | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended resources for 25 trainees.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
|  | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Business plan templates |  | 25 | 1:25 |
|  | Business Journals |  | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Newspapers and Handouts |  | 5 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with ornamental fish production books and E- section | 1 | 1:25 |

# MODULE IV

## PRINCIPLES OF FARM MANAGEMENT

**UNIT CODE: 0811 451 07A**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply farm management principles

**Unit duration: 100 Hours**

**Unit Description**

This unit describes knowledge, skills and attitudes required to apply farm management principles. It involves applying farm management concepts, managing marketing challenges in agricultural production, and applying farm accounting techniques. It also involves application of farm planning techniques.

**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. | Apply farm management concepts | 40 |
| 2. | Manage marketing challenges in agricultural production | 50 |
| 3. | Apply farm accounting techniques | 50 |
| 4. | Apply farm planning techniques | 40 |
| **Total** | | **180** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Apply farm management concepts | **1.1.** Functions of farm management   * + 1. Decision making     2. Setting objectives     3. Forecasting     4. Planning     5. Implementation     6. Controlling   1. Forms of business operations      1. Sole proprietorship      2. Partnerships      3. Cooperatives      4. Corporations      5. State corporations   2. Concepts of human resource management      1. Interviews and recruitment      2. Staff development      3. Human relations and communication      4. Labour retention | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Manage marketing challenges in agricultural production | * 1. Risks and uncertainties * Definition terms * Risks * Uncertainties   + - Types of risks and uncertainties       * Price       * Production risk       * Financial risks       * Government policy       * Individual risks       * Wars       * Earthquakes   1. Management of risks and uncertainties   2. Constraints facing agricultural marketing | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Apply farm accounting techniques | * 1. Farm records      1. Breeding records      2. Labour records      3. Health records      4. Visitation records   2. Books of account      1. Ledger      2. Cash book      3. Purchase journals      4. Sales journal      5. Receipt books   3. Statements of account      1. Balance sheet      2. Income statements      3. Cash flow statement      4. Profit and loss account   4. Prepare farm records   5. Prepare books of account   6. Prepare statement of account | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Apply farm planning techniques | * 1. Farm plan      + Definition of terms        - Farm plan        - Farm budget        - Business plan   + Importance of farm plan   1. Preparing farm budget   2. Developing business plan   + Prepare a farm plan   + Prepare a farm budget   + Develop a business plan | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended resources for 25 trainees.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
| 1. | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Business plan templates |  | 25 | 1:25 |
|  | Business Journals |  | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Farm management handouts |  | 5 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with agricultural economics books and E- section | 1 | 1:25 |

**FISH POST-HARVEST OPERATIONS.**

**UNIT CODE:** **0831 451 08A**

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Perform fish post-harvest operations

**Unit duration: 180 Hours**

**Unit Description**

This unit covers the competencies required in performing fish postharvest operations. It involves preparing harvested fish for value addition, preserving harvested fish and marketing whole fish and associated products.

**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 harvested fish for value addition | 60 |
| 2. | Process harvested fish | 60 |
| 3. | Perform fish marketing | 60 |
| **Total** | | **180** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| * 1. Prepare harvested fish for value addition | * 1. PPEs      1. Gloves      2. Face mask      3. Head cap/hair net      4. Apron      5. Gumboots      6. Face shield      7. Safety glasses   2. Assembling of tools and equipment for fish value addition      1. Basins      2. Buckets      3. Hard Brus      4. Filleting Tables      5. Knives      6. Waste Disposal Containers      7. Ice Box      8. Smoking Kiln      9. Solar Dryer\Drying Racks      10. Drying Mats or Canvas      11. Domestic Freezers      12. Ice      13. Salt      14. Frying Oil      15. Meat Mincer      16. Blender   3. Carrying out harvesting fish cleaning      1. Gutting      2. Washing the exposed cavity      3. Scale removal      4. Rinsing      5. Cleaning the work bench   4. Sorting harvested fish   5. Carrying out fish waste management      1. Landfill disposal      2. Land application      3. Compositing   6. Carry out fish grading and sorting | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Process harvested fish | 2.1. Use of PPEs   * 1. Selection of Fish processing tools and equipment   2. Harvested fish grading   3. Cleaning of harvested fish   4. Scaling of harvested fish   5. Gutted of harvested fish   6. Cleaning of gutted fish   7. Smoking of harvested fish   8. Sun drying of harvested fish   9. Salting of harvested fish   10. Freezing of harvested fish   11. Fileting and freezing of harvested fish   12. Long term preservation of harvested fish   13. Fish byproducts processing * Oils * Frames * Skins   1. Packaging and labelling * Packaging tools and equipment * Packaging materials * Labelling information   1. Product storage   2. Quality control during processing and storage   3. Carry out harvested fish processing | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Perform fish marketing | * 1. Use of PPEs in fish marketing   3.2.Carrying out of fish market survey   * 1. Assessment of fish   2. Identifying and disposal of unsuitable fish   3. Examination of fish display   4. Identification of current prices for fish products and services   5. Carry out fish processing wastes disposal | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

Project

Demonstration

Practicals

Discussions

Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/NO** | **Category/Item** | **Description/specification** | **Qty** | **Recommended ratio (item: trainee)** |
|  | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Business plan templates |  | 25 | 1:25 |
|  | HACCP manual | Latest | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | Cold room | Operational | 1 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with animal product processing books and E- section | 1 | 1:25 |

## PRINCIPLES OF AGRICULTURAL MARKETING

**UNIT CODE: 0811 451 09A**

**Unit Duration: 180 hours**

**Unit Description**

This unit describes knowledge, skills and attitudes required to apply agricultural marketing principles. It involves carrying out market analysis, carrying out marketing functions in agricultural production and using agricultural marketing institutions.

**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. | Carry out market analysis | 40 |
| 2. | Carry out marketing functions in agricultural production | 40 |
| 3. | Use agricultural marketing institutions | 40 |
| **Total** | | **120** |

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Carry out market analysis | * 1. Market information collection   2. Types of market      1. Perfect      2. Monopoly      3. Oligopoly      4. Monopsony   3. Analysis of Market structure | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Carry out marketing functions in agricultural production | * 1. Processing of agricultural products   2. Sorting and grading of agricultural products   3. Packaging and labelling of agricultural products   4. Marketing channels      1. Produce processors      2. Distributors      3. Wholesalers      4. Retailers   5. Carry out processing, sorting, grading, packaging and labelling of agricultural products | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |
| 1. Use agricultural marketing institutions | * 1. Cooperatives identification      1. Worker cooperatives      2. Consumer cooperatives      3. Union cooperatives   2. Aquaculture Marketing boards   3. Private companies used to market agricultural produce | * Practical * Project * Third party report * Portfolio of evidence * Written tests * Oral questioning |

**Suggested Methods of Instruction**

* Project
* Demonstration
* Practicals
* Discussions
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S/NO | Category/Item | Description/specification | Qty | Recommended ratio (item: trainee) |
|  | Projector | EPSOM | 1 | 1:25 |
|  | Whiteboard/smartboard | 2.5 By 1.5.M | 1 | 1:25 |
|  | Desktop/computer |  | 1 | 1:25 |
|  | Classroom | Well-lit with 25 seats | 1 | 1:25 |
|  | Business plan templates |  | 25 | 1:25 |
|  | Business Journals |  | 5 | 1:5 |
|  | Sets of Writing materials |  | 25 | 1:25 |
|  | marketing handouts |  | 5 | 1:25 |
|  | Video clips |  | 5 | 1:25 |
|  | Human resource | Trainer and Technician | 2 | 1:25 |
|  | Library | Equipped with marketing books and E- section | 1 | 1:25 |