REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

AQUACULTURE TECHNICIAN

LEVEL 5

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint, Vision 2030 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for the purpose of developing a competency-based curriculum for Aquaculture Management Level 5. These Occupational Standards will also be the bases for assessment of an individual for competence certification.

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

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

PREFACE

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

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

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Aquaculture Sector Skills Advisory Committee (SSAC), German International Cooperation and Ministry of Agriculture, Livestock and Fisheries have developed these Occupational Standards for an Aquaculture Technician. TVET CDACC in conjunction with Micro Enterprises Support Programme Trust (MESPT) have reviewed these Occupational Standards and incorporated Food Safety. These standards will be the bases for development of competency-based curriculum for Aquaculture Management Level 5.

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

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

CHAIRPERSON,
TVET CDACC

ACKNOWLEDGMENT

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

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

My gratitude also goes to NEPAD Planning and Coordinating Agency (NPCA) of the Africa Union Commission and German Ministry of Economic Cooperation and Development (BMZ) through its implementing agency German International Cooperation (GIZ) GmbH which enabled the development of these Standards through the CAADP ATVET project.

I also appreciate the office of the National Coordinator of GIZ CAADP ATVET Project which was instrumental in the cooperation between the project team, Ministry of Agriculture, Livestock and Fisheries (MoALF) and Ministry of Education.

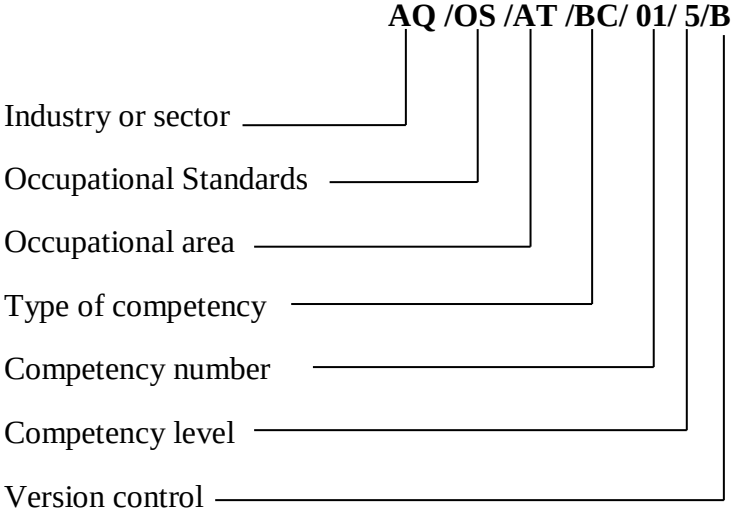
Much gratitude goes to Micro Enterprises Support Program Trust (MESPT) who initiated the review process and the incorporation of Food Safety in the Occupational Standards. I acknowledge the Danish International Development Agency (DANIDA) and the European Union (EU) who sponsored the review process.

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

CHAIRPERSON
AQUACULTURE SECTOR SKILLS ADVISORY COMMITTEE

KEY TO UNIT CODE

AQ /OS /AT /BC/ 01/ 5/B



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ACRONYMS

AQ	Aquaculture
AT	Aquaculture Technician
ATVET	Agricultural Technical and Vocational Education and Training
BC	Basic Competency
CAADP	Comprehensive Africa Agricultural Development Programme
CDACC	Curriculum Development, Assessment and Certification Council
CR	Core Competency
DANIDA	Danish International Development Agency
GIZ	German International Cooperation
MESPT	Micro Enterprises Support Programme Trust
OS	Occupational Standards
PPE	Personal Protective Equipment
SSAC	Sector Skills Advisory Committee

OVERVIEW

Aquaculture Management Level 5 consists of competencies for selection of suitable sites for constructing fish ponds, production of on-farm formulated fish feeds as well as promoting growth of natural foods in ponds and tanks. It also entails competencies for stocking the ponds and tank with fingerlings and raising these to market size under optimum conditions; setting up a small-scale fish hatchery and effectively operating it and fish harvesting, handling and processing.

This qualification consists of the following basic and core competencies:

BASIC UNITS OF COMPTENCIES	
UNIT CODE	**UNIT OF COMPETENCE**
AQ/OS/AT/BC/01/5/B	Demonstrate communication skills
AQ/OS/AT/BC/02/5/B	Demonstrate numeracy skills
AQ/OS/AT/BC/03/5/B	Demonstrate digital literacy
AQ/OS/AT/BC/04/5/B	Demonstrate entrepreneurial skills
AQ/OS/AT/BC/05/5/B	Demonstrate employability skills
AQ/OS/AT/BC/06/5/B	Demonstrate environmental literacy
AQ/OS/AT/BC/07/5/B	Demonstrate occupational safety and health practices
CORE UNITS OF COMPETENCIES	
AQ/OS/AT/CR/01/5/B	Set up fish pond
AQ/OS/AT/CR/02/5/B	Produce fish feeds
AQ/OS/AT/CR/03/5/B	Operate fish hatchery
AQ/OS/AT/CR/04/5/B	Produce grow out fish
AQ/OS/AT/CR/05/5/B	Handle harvested fish
AQ/OS/AT/CR/06/5/B	Set up small scale fish hatchery unit

BASIC UNITS OF COMPETENCY

DEMONSTRATE COMMUNICATION SKILLS

UNIT CODE: AQ/OS/AT/BC/01/5/B

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organization

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Meet communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met based on workplace requirements 1.2 Different communication approaches are identified and applied according to clients' needs 1.3 Conflict is identified and addressed as per the standards of the organization
2. Contribute to the development of communication strategies	2.1 Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as per organizations' strategic plan 2.2 Channels of communication are established and reviewed based on the workplace needs 2.3 Communication training needs are identified and provided according to SOPs 2.4 Work related network and relationship are maintained based on workplace requirements 2.5 Negotiation and conflict resolution strategies are maintained as per the workplace procedures

3. Conduct workplace interviews	3.1 ***Communication strategies*** are identified and employed in ***interview situations*** based on workplace requirements 3.2 Records of interviews are made and maintained in accordance with organizational procedures 3.3 Effective questioning, listening and nonverbal communication techniques are used based on needs
4. Facilitate group discussions	4.1 Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements 4.2 Strategies to encourage group participation are identified and used as per organizations' procedures 4.3 Meetings objectives and agenda are set and followed based on workplace requirements 4.4 Relevant information is provided and feedback obtained according to set protocols 4.5 Evaluation of group communication strategies is undertaken in accordance with workplace guidelines 4.6 Specific communication needs of individuals are identified and addressed as per individual needs
5. Represent the organization	5.1 Relevant presentation are researched and presented based on internal or external communication forums requirements Presentation is delivered in a clear and sequential manner as per the predetermined time 5.2 Presentation is made as per appropriate media 5.3 Difference views are respected based on workplace procedures 5.4 Written communication is done as per organizational standards 5.5 Inquiries are responded according to organizational standard

RANGE

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

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

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Active listening
- Giving/receiving feedback
- Interpretation of information
- Role boundaries setting
- Negotiation
- Ccommunication

Required Knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Met communication needs of clients and colleagues 1.2 Contributed to the development of communication strategies 1.3 Conducted interviews 1.4 Facilitated group discussions 1.5 Represented the organization
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report

4. Context of Assessment	Competency may be assessed: 4.1 On the job 4.2 Off the job 4.3 During industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE NUMERACY SKILLS

UNIT CODE: AQ/OS/AT/BC/02/5/B

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate numeracy skills. it involves calculating with whole numbers and familiar fractions, decimals, and percentages for work estimating, measuring, and calculating with routine metric measurements for work, using routine maps and plans for work, interpreting, drawing and constructing 2D and 3D shapes for work, interpreting routine tables, graphs and charts for work, collecting data and constructing routine tables and graphs for work and using basic functions of calculator.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range.***
1. Calculate with whole numbers and familiar fractions, decimals and percentages for work	1.1 Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted as per SOPs 1.2 Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended as per SOPs 1.3 Calculations which may involve a number of steps are performed as per SOPs 1.4 Calculations done with whole numbers and routine or familiar fractions, decimals and percentages as per SOPs 1.5 Conversion between equivalent forms of fractions, decimals and percentages is done as per SOPs 1.6 Order of operations is applied to solve multi-step calculations as per SOPs 1.7 Problem solving strategies are appropriately applied as per SOPs

	1.8 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per SOPs 1.9 Formal and informal mathematical language and symbolism are used to communicate the result of the task as per SOPs.
2. 2. Estimate, measure, and calculate with routine metric measurements for work	2.1 Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements 2.2 Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements 2.3 Measurements are estimated and made using correct units as per measurement manuals. 2.4 Estimations and calculations done as per routine measurements 2.5 Conversions performed routinely as per metric units 2.6 Problem solving processes are used to undertake the tasks as per workplace procedures. 2.7 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures 2.8 Information is recorded using mathematical language and symbols appropriate to discuss the task as per workplace procedures.
3. Use routine maps and plans for work	3.1 Features are identified in routine maps and plans as per SOPs 3.2 Symbols and keys in routine maps and plans are clearly explained as per SOPs 3.3 Orientation of map to North is identified and interpreted as per SOPs 3.4 Understanding of direction and location is clearly demonstrated as per SOPs 3.5 Simple scale is applied to estimate length of objects, or distance to location or object as per SOPs 3.6 Directions are given and received using both formal and informal language as per SOPs

4. Interpret, draw and construct 2D and 3D shapes for work	4.1 Two dimensional shapes and routine three dimensional shapes identified in everyday objects and in different orientations in accordance with job specifications 4.2 The use and application of shapes elaborately explained as per SOPs 4.3 Formal and informal mathematical language and symbols used to describe and compare the features of two dimensional shapes and routine three dimensional shapes as per workplace procedures. 4.4 Common angles identified in accordance with SOPs 4.5 Common angles in everyday objects are appropriately estimated as per SOPs 4.6 Formal and informal mathematical language are used to describe and compare common angles as per workplace procedures. 4.7 Common geometric instruments used to draw two dimensional shapes as per SOPs 4.8 Routine three dimensional objects constructed from given nets as per SOPs.
5. Interpret routine tables, graphs and charts for work	5.1 Routine tables, graphs and charts identified in predominately familiar texts and contexts as per tables and graph manuals 5.2 Common types of graphs and their different uses identified as per SOPs 5.3 Features of tables, graphs and charts identified as per workplace procedures 5.4 Information in routine tables, graphs and charts located and interpreted as per workplace procedures 5.5 Calculations are perform to interpret information as per SOPs 5.6 How statistics can inform and persuade interpretations is explained as per SOPs 5.7 Misleading statistical information is identified as per workplace procedures. 5.8 Information relevant to the workplace is discussed as per workplace procedures.

6. Collect data and construct routine tables and graphs for work	6.1 Features of common tables and graphs identified as per SOPs 6.2 Uses of ***different tables and graphs*** identified as per job specifications 6.3 Data and variables to be collected are determined as per workplace procedures. 6.4 The audience is determined as per the workplace procedures 6.5 Method of data collection is select as per job requirement 6.6 Data is collected as per SOPs 6.7 Information is collated in a table as per SOPs 6.8 Suitable scale and axes determined as per job specifications 6.9 Graph to present information is drafted and drawn as per SOPs 6.10 Data checked to ensure that it meets the expected results and context as per workplace procedures 6.11 Information is reported or discussed using formal and informal mathematical language as per workplace procedures
7. Use basic functions of calculator	*7.1* Keys are identified and used for ***basic functions on a calculator*** as per SOPs 7.2 Calculation is done using whole numbers, money and routine decimals and percentages as per SOPs 7.3 Calculation done with routine fractions and percentages as per SOPs 7.4 Order of operations is applied to solve multi-step calculations as per SOPs 7.5 Results are interpreted, displayed and recorded as per workplace procedures 7.6 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures 7.7 Formal and informal mathematical language and appropriate symbolism and conventions used to

	communicate the result of the task as per workplace procedures.

RANGE

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

Variable	**Range**
1. Use basic functions of calculator may include but not limited to:	• Addition • Multiplication • Calculate ratios • Conversion of ratios into percentages
2. Different tables and graphs may include but not limited to:	• Bar Graphs • Flow Charts • Pie Charts • Pictograph • Line Graphs • Time Series Graphs • Stem and Leaf Plot • Histogram • Dot Plot • Scatter plot

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Measuring
- Logical thinking

- Computing
- Drawing of graphs
- Applying mathematical formulas
- Analytical

Required knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages 1.2 Estimated, measured and calculated with routine metric measurements 1.3 Applied simple scale to estimate length of objects or distance to location or object 1.4 Used formal and informal mathematical language to describe and compare common angles 1.5 Used common geometric instruments to draw two dimensional shapes

	1.6 Collected data and constructed routine tables and graphs 1.7 Used basic functions of calculator correctly
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed in: 4.1 On the job 4.2 Off the job 4.3 Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE DIGITAL LITERACY

UNIT CODE: AQ/OS/AT/BC/03/5/B

UNIT DESCRIPTION

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

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Identify appropriate computer software and hardware	1.1 Concepts of ICT are determined in accordance with computer equipment 1.2 Classifications of computers are determined in accordance with manufacturers specification 1.3 ***Appropriate computer software*** is identified according to manufacturer's specification 1.4 ***Appropriate computer hardware*** is identified according to manufacturer's specification 1.5 Functions and commands of operating system are determined in accordance with manufacturer's specification
2. Apply security measures to data, hardware, software in automated environment	2.1 ***Data security and privacy are classified*** in accordance with the prevailing technology 2.2 ***Security threats*** are identified, **and** ***control measures*** are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected in accordance with Information security management guidelines 2.4 Protection against computer crimes is undertaken in accordance with laws governing protection of ICT

3. Apply computer software in solving tasks	3.1 ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation as per job requirements 3.2 ***Word processing utilities*** are applied in accordance with workplace procedures 3.3 Worksheet layout is prepared in accordance with work procedures 3.4 Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures 3.5 Continuous data manipulated on worksheet is undertaken in accordance with work requirements 3.6 Database design and manipulation is undertaken in accordance with office procedures 3.7 Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
4. Apply internet and email in communication at workplace	4.1 Electronic mail addresses are opened and applied in workplace communication in accordance with office policy 4.2 Office internet functions are defined and executed in accordance with office procedures 4.3 ***Network configuration*** is determined in accordance with office operations procedures 4.4 Official World Wide Web is installed and managed according to workplace procedures
5. Apply desktop publishing in official assignments	5.1 Desktop publishing functions and tools are identified in accordance with manufactures specifications 5.2 Desktop publishing tools are developed in accordance with work requirements 5.3 Desktop publishing tools are applied in accordance with workplace requirements 5.4 Typeset work is enhanced in accordance with workplace standards
6. Prepare presentation packages	6.1 Types of presentation packages are identified in accordance with office requirements 6.2 Slides are created and formulated in accordance with workplace procedures 6.3 Slides are edited and run in accordance with work procedures

	6.4 Slides and handouts are printed according to work requirements

RANGE

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

Variable	Range
1. Appropriate computer hardware may include but not limited to:	• Computer case • Monitor • keyboard • mouse
2. Data security and privacy may include but not limited to:	• Confidentiality of data • Cloud computing • Integrity -but-curious data surfing
3. Security and control measures may include but not limited to:	• Counter measures against cyber terrorism • Risk reduction • Cyber threat issues • Risk management • Pass wording
4. Security threats may include but not limited to:	• Cyber terrorism • Hacking

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Analytical skills
- Interpretation
- Typing

- Communication
- Basic ICT skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Software concept
- Functions of computer software and hardware
- Data security and privacy
- Computer security threats and control measures
- Technology underlying cyber-attacks and networks
- Cyber terrorism
- Computer crimes
- Detection and protection of computer crimes
- Laws governing protection of ICT
- Microsoft suite

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified and controlled security threats 1.2 Detected and protected computer crimes 1.3 Applied word processing in office tasks 1.4 Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 1.5 Opened electronic mail for office communication as per workplace procedure 1.6 Installed internet and World Wide Web for office tasks in accordance with office procedures 1.7 Integrated emerging issues in computer ICT applications 1.8 Applied laws governing protection of ICT

2. Resource Implications	The following resources should be provided: 2.1 Tablets 2.2 Laptops 2.3 Desktop computers 2.4 Calculators 2.5 Internet 2.6 Smart phones 2.7 Operation Manuals
3. Methods of Assessment	Competency may be assessed through: 3.1 Written Test 3.2 Observation 3.3 Practical assignment 3.4 Interview/Oral Questioning
4. Context of Assessment	Competency may be assessed in: 4.1 Off the job 4.2 On the job setting 4.3 Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE ENTREPRENEURIAL SKILLS

UNIT CODE : AQ/OS/AT/BC/04/5/B

UNIT DESCRIPTION

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

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate understanding of an Entrepreneur	1.1 Entrepreneurs and Businesspersons are distinguished as per principles of entrepreneurship 1.2 ***Types of entrepreneurs*** are identified as per principles of entrepreneurship 1.3 Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship 1.4 ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship 1.5 Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship
2. Demonstrate understanding of Entrepreneurship and self-employment	2.1 Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship 2.2 Importance of self-employment is analysed based on business procedures and strategies 2.3 ***Requirements for entry into self-employment*** are identified according to business procedures and strategies

	2.4 Role of an Entrepreneur in business is determined according to business procedures and strategies 2.5 Contributions of Entrepreneurs to National development are identified as per business procedures and strategies 2.6 Entrepreneurship culture in Kenya is explored as per business procedures and strategies 2.7 Born or made Entrepreneurs are distinguished as per entrepreneurial traits
3. Identify Entrepreneurship opportunities	3.1 Sources of business ideas are identified as per business procedures and strategies 3.2 Business ideas and opportunities are generated as per business procedures and strategies 3.3 Business life cycle is analysed as per business procedures and strategies 3.4 Legal aspects of business are identified as per procedures and strategies 3.5 Product demand is assessed as per market strategies 3.6 Types of ***business environment*** are identified and evaluated as per business procedures 3.7 Factors to consider when evaluating business environment are explored based on business procedure and strategies 3.8 Technology in business is incorporated as per best practice
4. Create entrepreneurial awareness	4.1 ***Forms of businesses*** are explored as per business procedures and strategies 4.2 Sources of business finance are identified as per business procedures and strategies 4.3 Factors in selecting source of business finance are identified as per business procedures and strategies 4.4 ***Governing policies*** on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies

	4.5 Problems of starting and operating SSEs are explored as per business procedures and strategies
5. Apply entrepreneurial motivation	5.1 ***Internal and external motivation*** factors are determined in accordance with motivational theories 5.2 Self-assessment is carried out as per entrepreneurial orientation 5.3 Effective communications are carried out in accordance with communication principles 5.4 Entrepreneurial motivation is applied as per motivational theories
6. Develop innovative business strategies	6.1 Business innovation strategies are determined in accordance with the organization strategies 6.2 Creativity in business development is demonstrated in accordance with business strategies 6.3 ***Innovative business strategies*** are developed as per business principles 6.4 Linkages with other entrepreneurs are created as per best practice 6.5 ICT is incorporated in business growth and development as per best practice
7. Develop Business Plan	7.1 Identified Business is described as per business procedures and strategies 7.2 Marketing plan is developed as per business plan format 7.3 Organizational/Management plan is prepared in accordance with business plan format 7.4 Production/operation plan in accordance with business plan format 7.5 Financial plan is prepared in accordance with the business plan format 7.6 Executive summary is prepared in accordance with business plan format 7.7 Business plan is presented as per best practice

RANGE

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

1. **Variable**	**Range**
2. Types of entrepreneurs may include but not limited to:	• Innovators • Imitators • Craft • Opportunistic • Speculators
3. Characteristics of Entrepreneurs may include but not limited to:	• Creative • Innovative • Planner • Risk taker • Networker • Confident • Flexible • Persistent • Patient • Independent • Future oriented • Goal oriented
4. Requirements for entry into self-employment may include but not limited to	• Technical skills • Management skills • Entrepreneurial skills • Resources • Infrastructure
5. Internal and external motivation may include but not limited to:	• Interest • Passion • Freedom • Prestige • Rewards • Punishment • Enabling environment • Government policies

6. Business environment may include but not limited to:	• External • Internal • Intermediate
7. Forms of businesses may include but not limited to:	• Sole proprietorship • Partnership • Limited companies • Cooperatives
8. Governing policies may include but not limited to:	• Increasing scope for finance • Promoting cooperation between entrepreneurs and private sector • Reducing regulatory burden on entrepreneurs • Developing IT tools for entrepreneurs
9. Innovative business strategies may include but not limited to:	• New products • New methods of production • New markets • New sources of supplies • Change in industrialization

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

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

Required Knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Distinguished entrepreneurs and business persons correctly 1.2 Identified ways of becoming an entrepreneur appropriately

	1.3 Explored factors affecting entrepreneurship development appropriately 1.4 Analysed importance of self-employment accurately 1.5 Identified requirements for entry into self-employment correctly 1.6 Identified sources of business ideas correctly 1.7 Generated Business ideas and opportunities correctly 1.8 Analysed business life cycle accurately 1.9 Identified legal aspects of business correctly 1.10 Assessed product demand accurately 1.11 Determined Internal and external motivation factors appropriately 1.12 Carried out communications effectively 1.13 Identified sources of business finance correctly 1.14 Determined Governing policy on small scale enterprise appropriately 1.15 Explored problems of starting and operating SSEs effectively 1.16 Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly 1.17 Prepared executive summary correctly 1.18 Determined business innovative strategies appropriately 1.19 Presented business plan effectively
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency may be assessed through: 3.1 Written tests 3.2 Oral questions 3.3 Third party report 3.4 Interviews 3.5 Portfolio
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job

	4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE EMPLOYABILITY SKILLS

UNIT CODE: AQ/OS/AT/BC/05/5/B

UNIT DESCRIPTION

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading small teams, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing workplace ethics.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Conduct self-management	1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives 1.2 Emotional intelligence is demonstrated as per workplace requirements. 1.3 Individual performance is evaluated and monitored according to the agreed targets. 1.4 Assertiveness is developed and maintained based on the requirements of the job. 1.5 Accountability and responsibility for own actions are demonstrated based on workplace instructions. 1.6 Self-esteem and a positive self-image are developed and maintained based on values. 1.7 Time management, attendance and punctuality are observed as per the organization policy. 1.8 Goals are managed as per the organization's objective 1.9 Self-strengths and weaknesses are identified based on personal objectives

2. Demonstrate interpersonal communication	2.1 Writing skills are demonstrated as per communication policy 2.2 Negotiation and persuasion skills are demonstrated as per communication policy 2.3 Internal and external stakeholders' needs are identified and interpreted as per the communication policy 2.4 Communication networks are established based on workplace policy 2.5 Information is shared as per communication policy
3. Demonstrate critical safe work habits	3.1 Stress is managed in accordance with workplace policy. 3.2 Punctuality and time consciousness is demonstrated in line with workplace policy. 3.3 Personal objectives are integrated with organization goals based on organization's strategic plan. 3.4 ***Resources*** are utilized in accordance with workplace policy. 3.5 Work priorities are set in accordance to workplace goals and objectives. 3.6 Leisure time is recognized and utilized in line with personal objectives. 3.7 ***Drugs and substances of abuse*** are identified and avoided based on workplace policy. 3.8 HIV and AIDS prevention awareness is demonstrated in line with workplace policy. 3.9 Safety consciousness is demonstrated in the workplace based on organization safety policy. 3.10 ***Emerging issues*** are identified and dealt with in accordance with organization policy.
4. Lead small teams	4.1 Performance targets for the ***team*** are set based on organization's objectives 4.2 Duties are assigned in accordance with the organization policy. 4.3 ***Forms of communication*** in a team are established according to organization's policy. 4.4 Team performance is evaluated based on set targets as per workplace policy.

	4.5 Conflicts are resolved between team members in line with organization policy. 4.6 Gender related issues are identified and mainstreamed in accordance workplace policy. 4.7 Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010. 4.8 Healthy relationships are developed and maintained in line with workplace.
5. Plan and organize work	5.1 Task requirements are identified as per the workplace objectives 5.2 Task is interpreted in accordance with safety (OHS), environmental requirements and quality requirements 5.3 Work activity is organized with other involved personnel as per the SOPs 5.4 Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5.5 Work activities are monitored and evaluated in line with organization procedures. 5.6 Job planning is documented in accordance with workplace requirements. 5.7 Time is managed achieve workplace set goals and objectives.
6. Maintain professional growth and development	6.1 Personal training needs are identified and assessed in line with the requirements of the job. 6.2 ***Training and career opportunities*** are identified and utilized based on job requirements. 6.3 Resources for training are mobilized and allocated based organizations and individual skills needs. 6.4 Licensees and certifications relevant to job and career are obtained and renewed as per policy.

	6.5 Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives. 6.6 Recognitions are sought as proof of career advancement in line with professional requirements.
7. Demonstrate workplace learning	7.1 Learning opportunities are sought and managed based on job requirement and organization policy. 7.2 Improvement in performance is demonstrated based on courses attended. 7.3 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job 7.4 Time and effort is invested in learning new skills based on job requirements 7.5 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy. 7.6 New systems are developed and maintained in accordance with the requirements of the job. 7.7 Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job.
8. Demonstrate problem solving skills	8.1 Creative, innovative and practical solutions are developed based on the problem 8.2 Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job. 8.3 Team problems are solved as per the workplace guidelines 8.4 Problem solving strategies are applied as per the workplace guidelines

	8.5 Problems are analyzed and assumptions tested as per the context of data and circumstances
9. Demonstrate workplace ethics	9.1 Policies and guidelines are observed as per the workplace requirements 9.2 Self-worth and professionalism is exercised in line with personal goals and organizational policies 9.3 Code of conduct is observed as per the workplace requirements 9.4 Integrity is demonstrated as per legal requirement

RANGE

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

Range	**Variable**
1. Drug and substance abuse may include but not limited to:	Commonly abused • Alcohol • Tobacco • Miraa • Over-the-counter drugs • Cocaine • Bhang • Glue
2. Feedback may include but not limited to:	• Verbal • Written • Informal • Formal

3. Relationships may include but not limited to:	• Man/Woman • Trainer/trainee • Employee/employer • Client/service provider • Husband/wife • Boy/girl • Parent/child • Sibling relationships
4. Forms of communication may include but not limited to:	• Written • Visual • Verbal • Non verbal • Formal and informal
5. Team may include but not limited to:	• Small work group • Staff in a section/department • Inter-agency group
6. Personal growth may include but not limited to:	• Growth in the job • Career mobility • Gains and exposure the job gives • Net workings • Benefits that accrue to the individual as a result of noteworthy performance
7. Personal objectives may include but not limited to:	• Long term • Short term • Broad • Specific
8. Trainings and career opportunities may include but not limited to	• Participation in training programs • Technical • Supervisory • Managerial • Continuing Education • Serving as Resource Persons in conferences and workshops
9. Resource may include but not limited to:	• Human • Financial • Hardware

	• Software
10. Innovation may include but not limited to:	• New ideas • Original ideas • Different ideas • Methods/procedures • Processes • New tools
11. Emerging issues may include but not limited to:	• Terrorism • Social media • National cohesion • Open offices
12. Range of media for learning may include but not limited to:	• Mentoring • peer support and networking • IT and courses

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Communication
- Critical thinking
- Observation
- Organizing
- Negotiation
- Monitoring
- Evaluation
- Record keeping
- Problem solving
- Decision Making
- Resource utilization

- Resource mobilization

Required Knowledge

The individual needs to demonstrate knowledge of:

- Work values and ethics
- Company policies
- Company operations, procedures and standards
- Occupational Health and safety procedures
- Fundamental rights at work
- Personal hygiene practices
- Workplace communication
- Concept of time
- Time management
- Decision making
- Types of resources
- Work planning
- Resources and allocating resources
- Organizing work
- Monitoring and evaluation
- Record keeping
- Workplace problems and how to deal with them
- Gender mainstreaming
- HIV and AIDS
- Drug and substance abuse
- Leadership
- Safe work habits
- Professional growth and development
- Technology in the workplace
- Emerging issues
- Social media
- Terrorism
- National cohesion

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Conducted self-management 1.2 Demonstrated interpersonal communication 1.3 Demonstrated critical safe work habits 1.4 Led small teams 1.5 Planned and organized work 1.6 Maintained professional growth and development 1.7 Demonstrated workplace learning 1.8 Demonstrated problem solving skills 1.9 Demonstrated workplace ethics
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Oral questioning 3.2 Portfolio of evidence 3.3 Third Party Reports 3.4 Written tests
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE ENVIRONMENTAL LITERACY

UNIT CODE: AQ/OS/AT/BC/06/5/B

UNIT DESCRIPTION

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs and monitoring activities on environmental protection/programs.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Control environmental hazard	1.1 ***Storage methods*** for environmentally ***hazardous*** materials are strictly followed according to environmental regulations and OSHS. 1.2 ***Disposal methods*** of hazardous wastes are followed always according to environmental regulations and OSHS. 1.3 ***PPE*** is used according to OSHS.
2. Control environmental Pollution control	2.1 Environmental pollution ***control measures*** are compiled following standard protocol. 2.2 Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999 2.3 Methods for minimizing ***noise pollution*** is complied with based on *Noise* and Excessive Vibration *Pollution and Control Regulations*, 2009
3. Demonstrate sustainable resource use	3.1 Methods for minimizing wastage are complied with.

	3.2 Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle) 3.3 Methods for economizing and reducing resource consumption are practiced as per the Environmental Management and Coordination Act 1999
4. Evaluate current practices in relation to resource usage	4.1 Information on resource efficiency **systems and procedures** are collected and provided to the work group where appropriate. 4.2 Current resource usage is measured and recorded by members of the work group. 4.3 Current purchasing strategies are analyzed and recorded according to industry procedures. 4.4 Current work processes to access information and data is analyzed following enterprise protocol.
5. Identify Environmental legislations/conventions for environmental concerns	5.1 Environmental ***legislations/conventions*** and local ordinances are identified according to the different ***environmental aspects/impact*** 5.2 ***Industrial standard/environmental practices*** are described according to the different environmental concerns
6. Implement specific environmental programs	6.1 Programs/Activities are identified according to organizations policies and guidelines. 6.2 Individual roles/responsibilities are determined and performed based on the activities identified. 6.3 Problems/constraints encountered are resolved in accordance with organizations' policies and guidelines 6.4 Stakeholders are consulted based on company guidelines
7. Monitor activities on Environmental protection/Programs	7.1 Activities are periodically monitored and evaluated according to the objectives of the environmental Program

	7.2 Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations 7.3 Data gathered are analyzed based on evaluation requirements 7.4 Recommendations are submitted based on the findings 7.5 Management support systems are set/established to sustain and enhance the program 7.6 Environmental incidents are monitored and reported to concerned/proper authorities

RANGE

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

Variable	**Range**
1. PPE may include but not limited to:	• Mask • Gloves • Goggles • Safety hat • Overall • Hearing protector • Safety boots
2. Environmental pollution control measures may include but not limited to:	• Methods for minimizing or stopping spread and ingestion of airborne particles • Methods for minimizing or stopping spread and ingestion of gases and fumes • Methods for minimizing or stopping spread and ingestion of liquid wastes
3. Waste management procedures may include but not limited to:	• Sorting • Storing of items • Recycling of items • Disposal of items

4. Resources may include but not limited to:	• Electric • Water • Fuel • Telecommunications • Supplies • Materials
5. Workplace environmental hazards may include but not limited to:	• Biological hazards • Chemical and dust hazards • Physical hazards
6. Organizational systems and procedures may include but not limited to:	• Supply chain, procurement and purchasing • Quality assurance • Making recommendations and seeking approvals

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Observation
- Measuring
- Writing
- Communication
- Analytical
- Monitoring
- Evaluation

Required Knowledge

The individual needs to demonstrate knowledge of:

- Storage methods of environmentally hazardous materials
- Disposal methods of hazardous wastes

- Usage of PPE Environmental regulations
- OSHS
- Types of pollution
- Environmental pollution control measures
- Different solid wastes
- Solid waste management
- Different noise pollution
- Methods of minimizing noise pollution
- Solid Waste Act
- Methods of minimizing wastage
- Waste management procedures
- Economizing of resource consumption
- 3Rs principle
- Types of resources
- Techniques in measuring current usage of resources
- Calculating current usage of resources
- Types of workplace environmental hazards
- Environmental regulations
- Environmental regulations applying to the enterprise.
- Measurement and recording of current resource usage
- Analysis current work processes to access information and data Analysis of data and information
- Identification of areas for improvement
- Resource consuming processes
- Determination of quantity and nature of resource consumed
- Analysis of resource flow of different parts of the resource flow process
- Use/conversion of resources
- Causes of low efficiency of use
- Increasing the efficiency of resource use
- Inspection of resource use plans
- Regulations/licensing requirements
- Determine benefit/cost for alternative resource sources
- Benefit/costs for different alternatives
- Components of proposals
- Criteria on ranking proposals
- Regulatory requirements

- Proposals for improving resource efficiency
- Implementation of resource efficiency plans
- Procedures in monitor implementation
- Adjustments of implementation plan
- Inspection of new resource usage

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Controlled environmental hazard 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use 1.4 Evaluated current practices in relation to resource usage 1.5 Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 1.6 Described industrial standard environmental practices according to the different environmental issues/concerns. 1.7 Resolved problems/ constraints encountered based on management standard procedures 1.8 Implemented and monitored environmental practices on a periodic basis as per company guidelines 1.9 Recommended solutions for the improvement of the Program 1.10 Monitored and reported to proper authorities any environmental incidents
2. Resource Implications	The following resources should be provided: 2.1 Workplace with storage facilities 2.2 Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.) 2.3 PPE 2.4 Manuals and references 2.5 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection

	2.6 Case studies/scenarios relating to environmental Protection
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Interview/Third Party Reports 3.5 Portfolio of evidence
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: AQ/OS/AT/BC/07/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement OSH programs, procedures and policies/ guidelines

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Identify workplace hazards and risk	1.1 ***Hazards*** in the workplace are identified ***based their indicators*** 1.2 Risks and hazards are evaluated based on legal requirements. 1.3 ***OSH concerns*** raised by workers are addressed as per legal requirements.
2. Control OSH hazards	2.1 Hazard prevention ***and control measures*** are implemented as per legal requirement. 2.2 Risk assessment is conducted and a risk matrix developed based on likely impact. 2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures.
3. Implement OSH programs	3.1 Company OSH program are identified, evaluated and reviewed based on legal requirements. 3.2 Company OSH programs are implemented as per legal requirements. 3.3 Workers are capacity built on OSH standards and procedures as per legal requirements 3.4 ***OSH-related records*** are maintained as per legal requirements.

RANGE

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

Variable	Range
1. Hazards may include but are not limited to:	• Physical hazards • Biological hazards • Chemical hazards • Ergonomics • Psychological factors • Physiological factors • Safety hazards • Unsafe workers' act
2. Indicators may include but are not limited to:	• Increased of incidents of accidents, injuries • Increased occurrence of sickness or health complaints/ symptoms • Common complaints of workers related to OSH • High absenteeism for work-related reasons
3. Evaluation and/or work environment measurements may include but are not limited to:	• Health Audit • Safety Audit • Work Safety and Health Evaluation • Work Environment Measurements of Physical and Chemical Hazards
4. OSH issues and/or concerns may include but are not limited to:	• Workers' experience/observance on presence of work hazards • Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks) • Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines

5. Prevention and control measures may include but are not limited to:	• Eliminate the hazard • Isolate the hazard • Substitute the hazard with a safer alternative • Use administrative controls to reduce the risk • Use engineering controls to reduce the risk • Use personal protective equipment • Safety, Health and Work Environment Evaluation • Periodic and/or special medical examinations of workers
6. Safety gears /PPE (Personal Protective Equipment's) may include but are not limited to:	• Arm/Hand guard, gloves • Eye protection (goggles, shield) • Hearing protection (ear muffs, ear plugs) • Hair Net/cap/bonnet • Hard hat • Face protection (mask, shield) • Apron/Gown/coverall/jump suit • Anti-static suits • High-visibility reflective vest
7. Appropriate risk controls	• Eliminate the hazard altogether • Isolate the hazard from anyone who could be harmed • Substitute the hazard with a safer alternative • Use administrative controls to reduce the risk • Use engineering controls to reduce the risk • Use personal protective equipment
8. Contingency measures may include but are not limited to:	• Evacuation • Isolation • Decontamination • Emergency personnel

9. Emergency procedures may include but are not limited to:	• Fire drill • Earthquake drill • Basic life support/CPR • First aid • Spillage control • Decontamination of chemical and toxic • Disaster preparedness/management • Set of fire-extinguisher
10. Incidents and emergencies may include but are not limited to:	• Chemical spills • Equipment/vehicle accidents • Explosion • Fire • Gas leak • Injury to personnel • Structural collapse • Toxic and/or flammable vapors emission.
11. OSH-related Records may include but are not limited to:	• Medical/Health records • Incident/accident reports • Sickness notifications/sick leave application • OSH-related trainings obtained

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

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

Required Knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified hazards in the workplace based their indicators 1.2 Evaluated workplace hazards based on legal requirements. 1.3 Addressed OSH concerns raised by workers as per legal requirements. 1.4 Implemented hazard prevention and control measures as per legal requirement. 1.5 Conducted risk assessment as per legal requirement. 1.6 Developed risk matrix based on likely impact. 1.7 Recognized and established contingency measures in accordance with organization procedures. 1.8 Identified, evaluated and reviewed company OSH program based on legal requirements. 1.9 Implemented company OSH programs as per legal requirements.

	1.10 Capacity built workers on OSH standards and procedures as per legal requirements 1.11 Maintained OSH-related records as per legal requirements.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

CORE UNITS OF COMPETENCY

SET UP FISH POND

UNIT CODE: AQ/OS/AT/CR/01/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to set up a fish pond. It involves implementing farm site food safety plan, site selection, pond design and construction and repair of the fish pond.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement farm site food safety plan	1.1 Farm site and adjacent site ***hazards*** are identified and documented 1.2 Possible **sources** of physical, chemical and microbial hazards are identified based on ***prior use of land.*** 1.3 ***Preventive measures*** for farm site hazards are implemented as per manual of standard operating procedures 1.4 Risk is communicated as per policies for internal and external communication
2. Prepare to set up a fish pond	2.1 Pond site is selected based on quality and quantity of water, soil type, topography and the level of identified risks. 2.2 ***Fish pond layout*** is designed as per specifications and principles of food hygiene. 2.3 ***Fish pond*** is designed in accordance with intended use, size and soil type. 2.4 Fish pond construction cost is worked out based on client's budget and the size of the pond. 2.5 ***Tools, equipment, food grade materials*** and ***supplies*** are identified and gathered based on job requirements. 2.6 ***Statutory requirements*** are met and necessary permits acquired from relevant authorities. 2.7 ***PPEs*** are identified and gathered as per job requirements.
3. Construct fish pond	3.1 Occupational safety precautions and food safety standards are applied according to pond site requirements and

	identified food safety risks 3.2 Fish pond site is cleared based on vegetation on the site and nature of topsoil. 3.3 Fish pond area is measured and pegged based on design dimensions. 3.4 A perimeter core trench is constructed around the pond area based on soil characteristics. 3.5 Fish pond area is excavated based on design dimensions. 3.6 Dykes are constructed and aligned to the design specification. 3.7 Supply and drainage channels are constructed based on design, topography and identified food safety risks. 3.8 Inlets and outlets are fitted based on design specifications and identified food safety risks. 3.9 Predator control devices and measures are applied as per identified food safety risks. 3.10 **Soil erosion control measures** are taken based on good agricultural practices manual
4. Test run the pond	4.1 Pond is filled with ***water fit for aquaculture*** stepwise to full capacity 4.2 Pond is checked for defects and wall stability as per standard operating procedures 4.3 Inlets and outlets are assessed against design specifications 4.4 Faults are reported and rectified as per standard operating procedures and identified food safety risks
5. Exit pond construction site	5.1 Recyclable materials and supplies are stored based manufacturer's instructions. 5.2 Non-recyclable materials are disposed off in regard to environmental protection regulations. 5.3 Tools and equipment are cleaned and stored as per workplace procedures. 5.4 Pond completion report is prepared and disseminated as per workplace procedures. 5.5 Hand over completed pond to the client

RANGE

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

Variable	Range
1. Prior use may include but not limited to:	• For animal feeding or domestic animal production; • As a waste disposal site (garbage or toxic industrial waste); • As a sanitary waste management site; • For mining activities, oil or gas extraction; • For former agricultural activities; • Adjacent land and neighboring areas (risk of cross-contamination); • History of flooding in area of concern.

2. Hazards may include but not limited to:	• Physical
	• Chemical
	  ○ Heavy metals
	  ○ Industrial chemicals
	  ○ Naturally occurring toxins
	  ○ Pesticides
	• Microbial
	• Parasites

3. Sources of hazards may include but not limited to:	• Agricultural chemicals • Toxic plants • Fecal matter • Soil • Water
4. Preventive measures may include but not limited to:	• Location, design and layout of farm • Farm waste management • Pond nets • Pest control • Pond lining • Runoff control
5. Water fit for aquaculture include but not limited to	• Fish species specific recommended level of chlorine • Fish species specific Recommended pH range • Fish species specific Recommended Ammonia • Fish species specific recommended turbidity level • Free of infective pathogens

6. Fish ponds include but not limited to:	• Earthen ponds • Lined ponds • Concrete ponds
7. Pond layout is up to	• 6 pounds of size 300m^2
8. Tools, equipment, materials and supplies include but not limited to:	• Tools-tape measure, spirit level, jembes, spades, pangas, • Equipment-plate compactors and rollers, wheelbarrows • Materials and supplies-ropes, liners, pegs, plumbing materials, lime, cement, sand,
9. Permits include but not limited to:	• Water abstraction permit (WARMA)

10. Statutory requirements include but not limited to:	• Relevant regulatory bodies
	  ○ KEBS
	  ○ Ministry of Health
	  ○ WARMA
	  ○ Ministry of Agriculture, Livestock and fisheries
	• EIA report
	• Lease agreement/ title deeds,

11. Soil erosion control measures include but not limited to:	• Planting grass on the dykes • Raising the dykes above adjacent ground level
12. PPE's include but not limited to	• Gum boots, helmets, gloves, overalls, first aid kits

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Food safety risk assessment and communication
- Use of tools and equipment
- Measurement
- Drawing and sketching
- Communication skills
- Basic first aid skills
- Design fish pond

- Interpretation of pond designs
- Basic survey skills
- Water quality parameter testing

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- National legislations and regulations
- Types of tools, equipment and PPEs
- Budgeting
- Behavior of predators and related control measures
- Water quality parameters
- Water quality test kits and digital meters

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented farm site food safety plan 1.2 Identified a suitable site for pond location 1.3 Cleared all vegetation and top soil, and stowed away from construction area 1.4 Measured and pegged the pond as per design dimensions 1.5 Positioned water intake structure, inlet pipe and outlet pipe 1.6 Aligned and compacted the dykes at regular intervals 1.7 Sloped the pond bottom to the required gradient 1.8 Tested the completed pond for functionality 1.9 Cleaned and stored tools and equipment as per work place procedures 1.10 Followed safety procedures
2. Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location 2.2 PPEs 2.3 Tools and equipment 2.4 Pond construction materials

	2.5 Writing materials
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Projects 3.4 Written tests
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these or during industrial attachment. Off the job assessment must be undertaken in a closely simulated workplace environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PRODUCE FISH FEEDS

UNIT CODE: AQ/OS/AT/CR/02/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce fish feeds. It involves ability to implement fish feed production food safety plan, boost the growth of natural fish food, formulate and prepare artificial fish feed and evaluate fish feed performance.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement fish feed production food safety plan	1.1 **Hazards** at each fish feed production stage are identified and listed 1.2 Possible **sources** of physical, chemical and microbial contamination are identified based on identified hazards 1.3 Food safety corrective and preventive measures for fish feeds are implemented based on the identified risks and manual of standard operating procedures. 1.4 Risk is communicated as per policies for internal and external communication
2. Produce natural fish feeds	2.1 PPE's are identified and gathered as per task requirements 2.2 Materials and equipment for producing natural fish foods are identified and gathered based on task requirements while observing food safety 2.3 Nutritional requirement of fish is determined based on target species and age 2.4 Pond is cleaned, limed and dried and flooded with water fit for aquaculture 2.5 Natural productivity of pond is determined based on secchi depth 2.6 Quantities and types of fertilizer is determined based on the level of productivity and identified food safety risks

	2.7 Fish pond is fertilized according to pond's natural productivity and recommended rates of fertilization
3. Produce on-farm formulated fish feeds	3.1 ***On-farm feed production materials and equipment*** are identified and gathered based on task requirements and identified food safety risks 3.2 Feed composition is formulated based on available ingredients and nutrient requirements of target species 3.3 ***Raw materials*** are procured from approved sources and handled as per food hygiene standards 3.4 Feed ingredients are subjected to appropriate ***treatments*** to inactivate anti-nutritional factors 3.5 Feed ingredients are milled to fine particles while observing food hygiene standards 3.6 Food safe feed additives are added 3.7 Formulated feed proportions are weighed and mixed uniformly 3.8 Feed mixture is pelletized and/or dried to a moisture content of 10% or less
4. Package and store fish feeds	4.1 Fish feed is weighed and packaged in sealed bags with clear **label details** 4.2 Dry fish feeds are stored in cool and dry areas 4.3 Moist fish feeds are properly refrigerated as per the identified food safety risks 1.1 Prices of feed production is determined based on cost of production
5. Evaluate fish feed performance	5.1 Quantity of natural food in the pond is estimated based on secchi depth 5.2 Fish growth rate is monitored according to ***sampling plan*** 5.3 Feeds are tested for suitability based on ***physical parameters***, palatability and feed conversion ratio

RANGE

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

Variable	Range
• Sources of hazards may include but not limited to:	• Ingredients used for formulation of feeds • Poor storage conditions • Pests • Rodents • Agricultural chemicals (pestic)
• Contamination/hazards may include but not limited to:	• Mycotoxins (microbial) • Physical • Chemical ○ Heavy metals
• Water fit for aquaculture include but not limited to	• Fish species specific recommended level of chlorine • Fish species specific Recommended pH range • Fish species specific Recommended Ammonia • Fish species specific recommended turbidity level • Free of infective pathogens
• PPE's include but not limited to	• Safety goggles, gum boots, helmets, gloves, dust coats, first aid kits, mouth piece
• Materials and equipment include but not limited to:	• Fertilizers, secchi disk, weighing scale • Buckets, gunny bags, sticks, stakes
• Nutritional requirements include but not limited to:	• Proteins, • Lipids/fats • Ash • Carbohydrates • Moisture • Mineral and vitamin
• Natural productivity includes but not limited to:	• Phytoplanktons • Zooplanktons

• On-farm feed production materials and equipment include but not limited to:	• Meat mincer, blender/ grinder, weighing scale, dryer, mixer, containers, bag sealer, oven, burner, drying racks • Packaging bags, drying canvas/ polythene
• Raw materials include but not limited to:	• Plant protein • Animal protein • Cereals and by-products • Mineral and other additives
• Treatments include but not limited to:	• Roasting • Boiling • Fermentation • Sun-drying
• Label details include but not limited to:	• Date of manufacture, name of manufacturer, date of expiry, storage conditions, protein level, pellet size, target species.
• Storage conditions include but not limited to:	• Humidity, temperature, ventilation, FIFO
• Sampling plan includes but not limited to:	• Sampling frequency • Sample size • Sampling time
• Physical parameters include but not limited to:	• floatability • bulk density • water stability • feed fines/ dust • size • shape • Texture

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Use of tools and equipment
- Measurement

- Mixing ingredients
- Communication
- Basic first aid
- Numeracy

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- Types of tools, equipment and PPEs
- Budgeting
- On-farm fish feed formulation
- Locally available raw materials
- Nutritional composition of the raw materials and their properties

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented fish feed production food safety plan 1.2 Used secchi disk accurately 1.3 Identified and calculated quantities and types of fertilizers to be used 1.4 Formulated feed composition correctly as per target species 1.5 Applied the correct fertilizer at right amounts using appropriate method 1.6 Applied the right treatment to inactivate anti-nutritional factors in selected feed ingredients 1.7 Weighed accurate amounts of feed ingredients based on feed formulation 1.8 Mixed feed ingredients uniformly 1.9 Tested feed for bulk density, water stability and floatability 1.10 Stored produced feed under recommended storage conditions

2.	Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location 2.2 PPEs 2.3 Materials and equipment 2.4 Raw materials 2.5 Writing materials
3.	Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Oral questioning 3.4 Projects 3.5 Written tests
4.	Context of Assessment	Competency may be assessed on the job, off the job or a combination of these or during industrial attachment. Off the job assessment must be undertaken in a closely simulated workplace environment.
5.	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

OPERATE FISH HATCHERY

UNIT CODE: AQ/OS/AT/CR/03/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to operate fish hatchery. It involves ability to implement fish hatchery food safety plan, source, stock and manage broodstock, breed, nurse and package fingerlings and maintain the hatchery facility.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement fish hatchery food safety plan	1.1 Food safety ***Hazards*** in the fish hatchery are identified and documented. 1.2 Possible ***sources*** of physical, chemical and microbial contamination in the hatchery are identified based on the hazards 1.3 ***Preventive measures*** for fish hatchery hazards are applied as per manual of standard operating procedures 1.4 ***Corrective measures*** for fish hatchery hazards are applied as per manual of standard operating procedures 1.5 Risk is communicated as per policies for internal and external communication
2. Manage Broodstock	2.1 ***PPE***'s are identified and gathered as per task requirements 2.2 ***Tools, equipment and materials*** are assembled as per task requirements 2.3 Quarantine ponds or tanks are cleaned, disinfected and filled with water fit for aquaculture as per standard operating procedures 2.4 Broodstock is identified and sourced from approved sources 2.5 Broodstock is acclimatized based on culture unit temperatures 2.6 Broodstock is quarantined based on information on possible infections from the source 2.7 Broodstock is sorted and stocked into broodstock ponds based on maturity stage and stocking density specific to the species

	2.8 Brood stock is fed at maintenance ratio 2.9 ***Water quality parameters*** are monitored at regular intervals
3. Produce fingerlings	3.1 Breeding facilities are cleaned and filled with water fit for aquaculture as per standard operating procedures 3.2 Broodstock is selected for breeding based on the number of fingerlings to be produced and state of readiness 3.3 Selected broodstock for natural breeding is transferred to breeding facilities based on species specific stocking density 3.4 Selected broodstock for artificial propagation is treated with recommended doses of ***hormones*** to induce breeding as per manual of standard operating procedures 3.5 Stripping, fertilization and incubation of eggs is carried out using standard procedures 3.6 Hatchlings produced are nursed based on optimum water quality parameter ranges and nutritional requirements 3.7 Tilapia hatchlings are sex reversed to males using feeds that have been treated using recommended hormone concentrations as per manual of standard operating procedures 3.8 Fish fry are graded regularly by size based on growth rates and stocking density 3.9 Fingerlings are harvested and packaged based on distance from the hatchery
4. Maintain hatchery facility	4.1 Water flow rate into tanks or ponds is regulated based on species cultured, stage of development and water quality ***4.2*** Hatchery facility is cleaned and disinfected with food grade cleaning and disinfecting agents 4.3 Water quality parameter ranges are maintained within optimum levels 4.4 ***Basic repairs*** on hatchery facilities are carried out based on identified faults

RANGE

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

Variable	Range

1. Hazards may include but not limited to:	• Physical
	• Biological
	• Chemical
	  ○ Heavy metals
	  ○ Pesticide residues
	• Sick fish
	• Parasites
	• Viruses
	• Bacteria
	• Hormones
	• Fish tags
	• Wrong species

2. Sources of hazards may include but not limited to:	• Infected parent stock/ broodstock • Poor water quality • Human carriers • Cleaning agents • Pesticides • Antibiotics misuse
3. Preventive measures may include but not limited to:	• Quarantine of brooders • Good water quality • Sanitary and phytosanitary measures • Biosecurity measures
4. Corrective measures may include but not limited to:	• Parasite control • Fish treatment • Water flow management • Sterilization of the hatchery
5. Food safety standards	• Codes of practice • Principles of food hygiene • Specifications for maximum limits for hazards
6. *Water fit for aquaculture* include but not limited to	• Fish species specific recommended level of chlorine • Fish species specific Recommended pH range • Fish species specific Recommended Ammonia • Fish species specific recommended turbidity level • Free of infective pathogens

7. PPE's include but not limited to:	• Safety goggles, gum boots, wading suit, gloves, dust coats, first aid kits, life ring, life jacket
8. Tools and equipment include but not limited to:	• Dissecting kit, weighing balance, pair of pincers, pestle and mortar, needle and syringe, measuring cylinders, hatching jars, larval rearing trays, perforators, basins, harvesting gear, happa nets, buckets, scoop nets, water test kits, refrigerator
9. Materials include but not limited to:	• Salt, towel, egg substrates, warm water, anaesthesia, 17-α Methyl Testosterone, feeds, fertilizers, ethanol, acetone, vials, cotton wool, assorted bowls
10. Water quality parameters include but not limited to:	• Dissolved oxygen, temperature, pH, ammonia, nitrite, alkalinity, turbidity,
11. Breeding facilities include but not limited to	• Earthen ponds, happa nets, concrete tanks, plastic tanks,
12. State of readiness include but not limited to:	• Ready to spawn (swollen abdomen), not yet ready, already spawned
13. Hormones include but not limited to:	• Pituitary extract, synthetic hormones
14. Basic repairs include but not limited to:	• Fixing minor leakages in ponds, pipes, tanks • Fixing damaged happa and harvesting nets

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Use of tools and equipment
- Weighing
- Numeracy
- Fish handling and packaging
- Dissection
- Identification of anatomical features
- Stripping and injection

- Basic first aid
- Hand sexing of brooders
- Identification of signs of healthy fish
- Testing water quality

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- Types of tools, equipment and PPEs
- Use of water test kits and equipment
- Fish breeding
- Basic fish anatomy and physiology
- Fish diseases
- Water quality parameters
- Fish feeds and feeding
- Fish hatchery biosecurity

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented fish hatchery food safety plan 1.2 Sourced brood stock with desirable features 1.3 Monitored water quality parameters using appropriate equipment 1.4 Quarantined incoming broodstock in specially designated ponds 1.5 Acclimatized the incoming fish upon arrival on the farm 1.6 Accurately selected ripe females for breeding exercise 1.7 Precisely identified and extracted pituitary gland from the donor fish 1.8 Stripped brood fish of maximum possible amount of eggs or milt without spilling or dropping the fish 1.9 Graded fry to uniform sizes

2.	Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location 2.2 PPEs 2.3 Materials, tools, and equipment 2.4 Broodstock
3.	Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Oral questioning 3.4 Projects 3.5 Written tests
4.	Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5.	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PRODUCE GROW OUT FISH

UNIT CODE: AQ/OS/AT/CR/04/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce grow out fish. It involves ability to Implement fish grow-out food safety plan, stock fish culture units with fingerlings, feed and manage them until attainment of market size. It also involves the competencies required to maintain the fish culture units, control predators and harvest fish.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement Fish Grow-out Food safety plan	1.1 Food safety ***Hazards*** in the fish grow-out are identified and documented. 1.2 Possible ***sources*** of physical, chemical and microbial contamination in the fish grow-out are identified based on the hazards. 1.3 ***Preventive measures*** for fish grow-out hazards are applied as per manual of standard operating procedures 1.4 ***Corrective measures*** for fish grow-out hazards are applied as per manual of standard operating procedures 1.5 Risk is communicated as per policies for internal and external communication
2. Prepare grow out culture units	2.1 ***PPEs*** are identified and gathered as per task requirement 2.2 Safety precautions are adhered to 2.3 ***Tools, equipment and materials*** are assembled in line with task requirement 2.4 ***Grow out culture unit*** is drained to dryness 2.5 Grow out culture unit is cleaned, and minor repairs carried out based on identified faults 2.6 Grow out culture unit is limed as per the measured pH levels and soil texture

	2.7 Grow culture unit is filled with ***water fit for aquaculture*** to required depth as determined by the overflow height. 2.8 Grow out culture unit is fertilized uniformly as per the recommended fertilization rates
3. Stock grow out culture units	3.1 ***Stocking plan*** is prepared as per the capacity of the culture units to be stocked 3.2 Fingerlings are sourced from approved hatcheries 3.3 Fingerlings are transported to the farm under controlled temperatures and aeration. 3.4 Fingerlings are acclimatized based on culture unit temperatures 3.5 Fingerlings are gently released in to culture units as per the stocking plan 3.6 Stocked ponds are monitored for fingerling stress and mortalities through direct observations
4. Manage fish stock	4.1 Fish feeding plan is developed based on the cultured fish species 4.2 Fish feeds or fish feed ingredients are sourced from approved sources and handled as per food hygiene standards 4.3 Fish are fed as per the feeding plan and cultured species 4.4 Feeding ration adjustments are done based on results from periodic fish sampling and weight measurements 4.5 Fertilization of the culture units is carried out in accordance with secchi depth measurements 4.6 Water quality parameters are monitored and remedial measures undertaken in accordance with target species optimum ranges 4.7 Fish pond is fertilized based on pond's natural productivity and recommended rates of fertilization 4.8 Fish are checked for signs of stress and disease based on physical appearance and behavioral changes 4.9 Remedial measures for stressed and diseased fish are undertaken as per Food and Agriculture Organization (FAO) guidelines-Technical guidelines for

		responsible fisheries-aquaculture
5. Control fish predators and intrusive animals	5.1 5.2	***Fish predators and intrusive animals*** are identified ***Control measures*** for predators and intrusive animals are put in place as per identified risks
6. Harvest fish stock	6.1 6.2 6.3 6.4	Plan to harvest fish is prepared as per the identified market demand ***Harvesting tools, equipment and materials*** are assembled in line with task requirement Harvesting of fish is carried out using appropriate nets and techniques while observing good hygienic practices Harvested fish is sorted according to size and species while observing good hygienic practices
7. Maintain grow out culture units	7.1 7.2 7.3 7.4 7.5	***Maintenance tools, equipment and materials*** are assembled as per the task requirements Grass on pond dykes is cleared periodically to ground level Weeds in the pond are completely removed while observing good aquaculture practices Surrounding vegetation is cleared as per best farm management practices Pipes and drainage blockages are cleared to allow free flow of water

RANGE

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

Variable	Range
1. Hazards may include but not limited to:	• Physical • Chemical ○ Heavy metals • Microbial • Sick fish • Antibiotic residues • Bio-accumulation • Parasites • Viruses • Bacteria
2. Sources of hazards may include but not limited to:	• Poor feeding • Poor feed quality • Poor water quality • Human carriers • Cleaning agents • Pesticides • Industrial/ agricultural wastes
3. Preventive measures may include but not limited to:	• Good water quality • Sanitary measures • Proper use of antibiotics • Disease management • Parasite control • Use of quality feed • Good hygienic practices • Biosecurity measures • Probiotics
4. Corrective measures may include but not limited to:	• Disposal of contaminated fish • Fish treatment • Water flow management • Sterilization of the fish grow-out

5. Water fit for aquaculture include but not limited to	• Fish species specific recommended level of chlorine • Fish species specific Recommended pH range • Fish species specific Recommended Ammonia • Fish species specific recommended turbidity level • Free of infective pathogens
6. PPEs include but not limited to:	• Safety goggles, gum boots, helmets, gloves, dust coats, first aid kits, industrial mouth piece
7. Tools, equipment and materials include but not limited to:	• Measuring tape, weighing scale, wheelbarrow, pH meter, jembes, spades, rakes. Lime, fertilizer, tamper, ropes, liner repair kit
8. Grow out culture unit include but not limited to	• Earthen ponds, concrete tanks, plastic tanks, fiberglass, raceways
9. Stocking plan entails but not limited to:	• Species of fish, stocking density, source of fingerlings, stocking schedule
10. Fish predators and intrusive animals include but not limited to:	• Birds, mammals, reptiles, amphibians, invertebrates, man
11. Control measures include but not limited to:	• Clearing grass • Trimming vegetation • Traps and scarecrows • Net covers • Twines • Screens • Fencing
12. Harvesting tools, equipment and materials include but not limited to:	• Seine net, scoop net, buckets, laundry baskets, weighing scale, perforators
13. Maintenance tools, equipment and materials include but not limited to:	• Slashers, machetes, jembes, spades, wheelbarrow, rakes, gunny bags

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Food safety risk assessment and communication
- Use of tools and equipment
- Basic plumbing
- Pond construction
- Measuring
- Fish handling
- Record keeping
- Fish feeding
- Predator control
- Fish harvesting
- Communication
- Basic first aid
- Numeracy

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- Types of tools, equipment and PPEs
- Fish disease
- Basic fish biology
- Fish feeds and feeding methods
- Types and characteristics of fertilizers
- Water quality parameters
- Fish predators and intrusive animals

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented fish grow-out food safety plan 1.2 Drained grow out culture unit to dryness 1.3 Fertilized fish pond using the recommended rates 1.4 Acclimatized and gently released the fingerlings into culture units 1.5 Calculated accurate feed rations based on sampled weights 1.6 Positively diagnosed fish for signs of stress and disease 1.7 Put in place effective measures for control of predators and intrusive animals 1.8 Harvested fish using appropriate techniques 1.9 Maintained a clean environment within and around the production area
2. Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location 2.2 PPEs 2.3 Tools, materials and equipment 2.4 Writing materials 2.5 Calculator
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Oral questioning 3.4 Projects 3.5 Written tests
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these or during industrial attachment. Off the job assessment must be undertaken in a closely simulated workplace environment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

HANDLE HARVESTED FISH

UNIT CODE: AQ/OS/AT/CR/05/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to handle harvested fish. It involves ability to implement fish harvesting food safety plan, clean, preserve and process harvested fish. It involves marketing of the fish products and by-products as well as disposal of wastes from fish processing.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement Fish Harvesting Food Safety plan	1.1 Common food safety ***Hazards*** in the fish handling are identified and documented. 1.2 Possible ***sources*** of physical, chemical and microbial contamination in the fish handling are identified based on the hazards 1.3 ***Preventive measures*** for fish handling hazards are applied as per manual of standard operating procedures 1.4 ***Corrective measures*** for fish handling hazards are applied as per manual of standard operating procedures 1.5 Risk is communicated as per policies for internal and external communication
2. Preserve harvested fish	2.1 Fish is preserved as per code of hygiene practice for the handling, processing, storage and the placing on the market of fish and fisheries products 2.2 ***PPEs*** are identified and gathered as per task requirements 2.3 ***Tools, equipment and materials*** are assembled in line with task requirements 2.4 Harvested fish is graded according to size and species as per the target market while observing good hygiene practices

	2.5 Fish is cleaned with potable water to remove all slime and foreign materials 2.6 Fish is de-scaled as per target market requirements 2.7 Fish is gutted to remove visceral material without rupturing (intact) 2.8 Gutted fish is cleaned to remove blood stains and gut remains from stomach cavity 2.9 Fish meant for short term preservation is kept in appropriate containers with ice in alternate layers following standard icing procedures 2.10 Fish meant for long term storage is smoked, sundried, salted or frozen depending on market preference while observing food hygienic practices and control measures for identified food safety risks
3. Process harvested fish	3.1 Fish for processing is handled, stored, transported and processed according to code of hygiene practice for the handling, processing, storage and the placing on the market of fish and fisheries products 3.2 Whole fish is filleted as per target market specifications 3.3 Fish mince is prepared out of fish fillets or trimmings using recommended technique 3.4 Whole fish, fish fillets or portions are deep fried to a golden-brown color 3.5 Fish balls are prepared from fish trimmings or fish mince according to target market specification 3.6 Marketable fish by-products are identified, collected and sorted into containers, based on market specifications 3.7 Marketable fish by-products are processed based on their form and nature 3.8 Packaging tools, equipment and materials are assembled in line with task requirements 3.9 Processed fish products and by-products are packaged using material appropriate to type, size and weight of the product or by-product 3.10 Packaged product or by-product is labelled according to statutory regulations and target market requirements

	3.11 Packaged products or by-products are stored in designated areas using the FIFO approach 3.12 Storage conditions of stored fish products and by-products are monitored regularly
4. Manage waste from fish processing	4.1 Fish processing wastes are collected at every stage and separated according to their physical state. 4.2 Collected wastes are handled in a manner to avoid cross contamination and harboring of pests 4.3 Solid and liquid wastes are disposed of according to the environmental management and coordination (waste management) regulations.
5. Market fish, fish products and by-products	5.1 Price of fish and fish products is determined based on costs of production, demand and supply and price of alternative products. 5.2 Market outlets are identified and contacted 5.3 Appropriate mode of transport to market is determined according to product form and quantities, and distance to market 5.4 Fish, fish products and by-products are sold at a profit 5.5 Product handling is carried out according to hygienic standards set out in KEBS code of hygienic standards for fishery products

RANGE

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

Variable	**Range**

1. Hazards may include but not limited to:	• Pathogenic bacteria
	  ○ e.g. Salmonella spp.
	• Chemical contaminants
	  ○ e.g. Histamine
	• Viruses
	  ○ e.g. Hepatitis
	• Fungi
	  ○ Moulds
	• Foreign matter
	  ○ Hair
	  ○ Jewellery
	• Pests

2. Sources of hazards may include but not limited to:	• Personnel hygiene facilities and toilets • Cleaning agents • Fraud • Wash water quality • Equipment and facilities • Lubricants • Wastes
3. Preventive measures may include but not limited to:	• Personal hygiene • Personnel health checks every 6 months • Use of food grade cleaning agents and lubricants • Pest control • Fraud control • Use of potable water • Use of food grade equipment • Proper storage conditions • Maintenance and sanitation of equipment and facilities • Temperature controls (below 4°C) • Plant hygiene • Biosecurity measures • PPEs • Waste management
4. Corrective measures may include but not limited to:	• Disposal of contaminated fish • Sterilization of the fish handling plant
5. PPEs include but not limited to	• Gum boots, head cover, gloves, dust coats, first aid kits, mouth piece, apron

6. Tools**,** equipment and materials include but not limited to:	• Basins, buckets, hard brush, filleting tables, knives, waste disposal containers, ice box, smoking kiln, solar dryer, drying racks, drying mats or canvass, domestic freezers, ice, salt, frying oil, meat mincer, blender, crockery,
7. Packaging tools, equipment and materials	• Weighing balance, polybags, cartons, gunny bags, ice packs, baskets, cool boxes, sealing tape, labels, pallets, wheel barrow.

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Food safety risk assessment
- Use of tools and equipment
- Weighing
- Fish handling
- Fish preservation
- Fish processing
- Packaging
- Record keeping
- Communication
- Basic first aid
- Numeracy

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- Types of tools, equipment and PPEs
- Fish spoilage
- Fish handling, processing and preservation
- Marketing and market dynamics
- Workplace safety regulations

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented fish harvesting food safety plan 1.2 Graded fish into uniform sizes by species 1.3 Cleaned fish to remove all slime and foreign materials 1.4 Gutted fish to remove all visceral material 1.5 Preserved fish using appropriate method 1.6 Processed fish into various products and by-products 1.7 Packaged and stored fish products in designated areas 1.8 Marketed fish products 1.9 Observed hygienic standards 1.10 Disposed of waste from fish processing
2. Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location 2.2 PPEs 2.3 Tools, materials and equipment 2.4 Writing materials 2.5 Calculator
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Oral questioning 3.4 Simulation 3.5 Written tests
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these or during industrial attachment. Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

SET UP SMALL-SCALE FISH HATCHERY UNIT

UNIT CODE: AQ/OS/AT/CR/06/5/B

UNIT DESCRIPTION

This unit specifies the competencies required to set up small scale fish hatchery unit. It involves ability to implement fish hatchery site food safety plan, interpret simple fish hatchery designs, select ideal hatchery construction sites and prepare cost estimates for hatchery construction. It also involves supervision of hatchery construction and installation of bio-security measures.

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Implement fish hatchery site Food safety plan	1.1 Fish hatchery site and adjacent site ***hazards*** are identified and documented. 1.2 Possible ***sources*** of physical, chemical and microbial contamination are identified based on ***prior use of land***. 1.3 ***Preventive measures*** for fish hatchery site hazards are applied as per manual of standard operating procedures 1.4 Risk is communicated as per policies for internal and external communication
2. Prepare to set up a fish hatchery unit	2.1 Hatchery design is analyzed for specific component dimensions and relative locations 2.2 Proposed hatchery design is validated on site 2.3 Details and cost of labour and materials is worked out according to prevailing prices 2.4 Statutory requirements are established and complied with
3. Supervise fish hatchery construction	3.1 ***PPEs*** are identified and gathered as per task requirements 3.2 ***Tools, equipment, food grade materials*** and ***supplies*** are identified and gathered based on task requirements

	3.3 Site is secured and cleared of unwanted vegetation and debris 3.4 Pegging and construction of nursery and brood stock culture units is carried out to design specifications 3.5 Installation of ***indoor hatchery facilities*** is carried out following design specifications 3.6 Water abstraction and ***plumbing works*** are carried out according to the design 3.7 ***Hatchery components*** are tested for functionality and identified defects are rectified
4. Set up bio-security measures	4.1 Footbaths are installed at hatchery entrances and other strategic points 4.2 Quarantine facilities are constructed at safe distance as outlined in the hatchery designs 4.3 Filtration systems for the incoming water is installed 4.4 Perimeter fence is constructed around the facility 4.5 ***Intruder control facilities and devices*** are installed at strategic points as per identified food safety risks

RANGE

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

Variable	**Range**
1. Prior use may include but not limited to:	• For animal feeding or domestic animal production; • As a waste disposal site (garbage or toxic industrial waste); • As a sanitary waste management site; • For mining activities, oil or gas extraction; • For former agricultural activities; • Adjacent land and neighboring areas (risk of cross-contamination); • History of flooding in area of concern.

2. Statutory requirements may include but not limited to:	• Compliance to standards and regulations • Kenya Fisheries Service • County Government • The Fisheries Management and Development Act No.35 of 2016. • The Codex Alimentarius Food Hygiene Basic Texts; • The Food Drugs and Chemical Substances Act Cap. 254 of the Laws of the Kenya; • The Pest Control Products Act, Cap. 346 of the Laws of Kenya; • The Public Health Act, Cap. 242 of the Laws of Kenya; • The Environmental Management and Co-ordination Act, 1999.

3. Hazards may include but not limited to:	• Physical
	• Chemical
	  ○ Heavy metals
	  ○ Pesticides
	  ○ Industrial chemicals
	• Microbial
	• Parasites
	• Naturally occurring toxins

4. Sources of hazards may include but not limited to:	• Agricultural chemicals • Toxic plants • Fecal matter • Soil • Water
5. Preventive measures may include but not limited to:	• Location, design and layout of farm • Farm waste management • Pond nets • Pest control • Pond lining • Runoff control
6. Labour includes but not limited to:	• Casual, skilled, consultancy
7. PPE's include but not limited to	• Gum boots, helmets, goggles, gloves, overalls, first aid kits

8. Tools, equipment, materials and supplies include but not limited to:	• Tools-tape measure, spirit level, jembes, spades, pangas, plumbing tools, masonry • Equipment-plate compactors and rollers, wheelbarrows, aeration equipment, filtration • Materials and supplies-ropes, liners, pegs, plumbing materials, lime, cement, sand, roofing materials, fencing wire, fittings, assorted screens, netting materials
9. Indoor hatchery facilities include but not limited to :	• Tanks, sorting tables, packaging tables, plumbing works, incubation unit,
10. Plumbing works involve but not limited to :	• Connection piping to the hatchery block • inlet and outlet installations • drainage • storage tanks • water flow control structures
11. Hatchery components include but not limited to:	• Water storage tanks, intake structure, fish culture tanks, lighting systems, aeration system, filtration system, drainage, water flow control structures, biosecurity installations
12. Intruder control facilities and devices include but not limited to:	• Nets, meshes, screens, cover nets, gates

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Food safety risk assessment and communication
- Use of tools and equipment
- Measurement
- Drawing and sketching
- Communication skills
- Basic first aid skills

- Interpretation of simple hatchery design
- Masonry skills
- Basic plumbing
- Budgeting

Required Knowledge

The individual needs to demonstrate knowledge of:

- Food safety Standards (codes of practice for fish and fishery products)
- Regulatory bodies/ Competent authorities
- Hazard Analysis Critical Control Point (HACCP)
- National legislations and regulations
- Types of tools, equipment and PPEs
- Budgeting
- Types of nets, meshes and their properties
- Predator and intruder behavior
- Water filtration mechanisms
- Disease causing pathogens
- Pond design, layout and construction

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Implemented fish hatchery site food safety plan 1.2 Identified a suitable location for the hatchery 1.3 Worked out hatchery construction costs 1.4 Complied with all statutory requirements 1.5 Adhered to safety precautions 1.6 Constructed nursery and Broodstock ponds 1.7 Supervised construction of hatchery block and indoor facilities 1.8 Tested hatchery component to establish functionality and rectified faults 1.9 Installed biosecurity structures
2. Resource Implications	The following resources must be provided: 2.1 Workplace or assessment location

		2.2 PPEs 2.3 Tools, equipment and materials 2.4 Pond construction materials 2.4 Building materials 2.5 Writing materials
3.	Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral presentation 3.3 Projects 3.4 Written tests
4.	Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5.	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.