

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**GEMOLOGY 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 Kenya’s development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the 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 developing a competency based curriculum for Gemmology 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 Gemmology 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 toreform curriculum development, assessment and certification. This called for shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), Gemmology Sector Skills Advisory Committee (SSAC) and Ruiru Gikonyo Memorial Institute for Technical Skills have developed these Occupational Standards for a Gemmologist. These National occupational standards will be the bases for development of competency-based curriculum for Gemmology Level 5. These Standards will also be the bases for assessment of an individual for competence certification.

The National 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, Gemmology SSAC, expert workers and all those who participated in the development 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 sincerely thankful to Ruiru Gikonyo Institute for Technical Skills for providing the finance and mobilising the industry players who played a key role in the development of these Standards.

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

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

**CHAIRPERSON**

**GEMMOLOGY SECTOR SKILLS ADVISORY COMMITTEE**

# ABBREVIATION AND ACRONYMS

2D Two Dimensional

4C Clarity, Cut, Colour, Carat weight

AIDS Acquired Immune Deficiency Syndrome

BC Basic Competency

CC Common Competency

CDACC Curriculum Development, Assessment and Certification Council

CR Core Competency

CU Curriculum

GIA Gemology Institute of America

HIV Human Immuno-Deficiency Virus

ICT Information Communication Technology

NEMA National Environmental Management Authority

OSHA Occupation Safety and Health Act

OSHS Occupation Safety and Health Standards

PESTEL Political Economic Social Technological Environmental and Legal

PPE Personal Protective Equipment

SG Specific Gravity

SOP Standard Operating Procedures

SSAC Sector Skills Advisory Committee

SWOT Strengths Weaknesses Opportunities and Threats

TVET Technical and Vocational Education and Training

XRF X-ray fluorescence

# KEY TO UNIT CODE

**MIN/OS/GEM/BC/01/5/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control version

# 

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# OVERVIEW

Gemmology Technician Level 5 entails competencies that an individual must achieve to enable him/her to work in the gemstone industry. It entails carrying out gemstone identification, performing gemstone grading, carrying out gemstone processing and crafting jewellery products

The units of competency comprising Gemmology Level 5 include the following:

**BASIC COMPETENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/BC/01/5/A | Demonstrate communication skills |
| MIN/OS/GEM/BC/02/5/A | Demonstrate numeracy skills |
| MIN/OS/GEM/BC/03/5/A | Demonstrate digital literacy |
| MIN/OS/GEM/BC/04/5/A | Demonstrate entrepreneurial skills |
| MIN/OS/GEM/BC/05/5/A | Demonstrate employability skills |
| MIN/OS/GEM/BC/06/5/A | Demonstrate environmental literacy |
| MIN/OS/GEM/BC/07/5/A | Demonstrate occupational safety and health practices |
| **COMMON COMPENTENCIES** | |
| MIN/OS/GEM/CC/01/5/A | Understand geology principles |

**CORE COMPENTENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/CR/01/5/A | Carryout gemstone identification |
| MIN/OS/GEM/CR/02/5/A | Perform gemstone grading |
| MIN/OS/GEM/CR/03/5/A | Carry out gemstone processing |
| MIN/OS/GEM/CR/04/5/A | Craft jewellery products |

# BASIC UNITS OF COMPETENCY

## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/01/5/A

**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 organisation

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Meet communication needs of clients and colleagues | 1. Specific communication needs of clients and colleagues are identified and met based on workplace requirements 2. Different communication approaches are identified and applied according to clients’ needs 3. Conflict is identified and addressed as per the standards of the organization |
| 1. Contribute to the development of communication strategies | 1. Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as per organizations’ strategic plan 2. Channels of communication are established and reviewed based on the workplace needs 3. Communication training needs are identified and provided according to SOPs 4. Work related network and relationship are maintained based on workplace requirements 5. Negotiation and conflict resolution strategies are maintained as per the workplace procedures |
| 1. Conduct workplace interviews | 1. ***Communication strategies*** are identified and employed in ***interview situations*** based on workplace requirements 2. Records of interviews are made and maintained in accordance with organizational procedures 3. Effective questioning, listening and nonverbal communication techniques are used based on needs |
| 1. Facilitate group discussions | 1. Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements 2. Strategies to encourage group participation are identified and used as per organizations’ procedures 3. Meetings objectives and agenda are set and followed based on workplace requirements 4. Relevant information is provided and feedback obtained according to set protocols 5. Evaluation of group communication strategies is undertaken in accordance with workplace guidelines 6. Specific communication needs of individuals are identified and addressed as per individual needs |
| 1. Represent the organization | 1. 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 2. Presentation is made as per appropriate media 3. Difference views are respected based on workplace procedures 4. Written communication is done as per organizational standards 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 |
| 1. 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, behavior * Putting together response which is culturally appropriate * Expressing an individual perspective * Expressing own philosophy, ideology and background and exploring impact with relevance to communication * Openness and flexibility in communication |
| 1. 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
* Communication

**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. Met communication needs of clients and colleagues 2. Contributed to the development of communication strategies 3. Conducted interviews 4. Facilitated group discussions 5. Represented the organization |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed:   1. On the job 2. Off the job 3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE NUMERACY SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/02/5/A

**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. Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted as per SOPs 2. Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended as per SOPs 3. Calculations which may involve a number of steps are performed as per SOPs 4. Calculations done with whole numbers and routine or familiar fractions, decimals and percentages as per SOPs 5. Conversion between equivalent forms of fractions, decimals and percentages is done as per SOPs 6. Order of operations is applied to solve multi-step calculations as per SOPs 7. Problem solving strategies are appropriately applied as per SOPs 8. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per SOPs 9. Formal and informal mathematical language and symbolism are used to communicate the result of the task as per SOPs. |
| 1. Estimate, measure, and calculate with routine metric measurements for work | 1. Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements 2. Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements 3. Measurements are estimated and made using correct units as per measurement manuals. 4. Estimations and calculations done as per routine measurements 5. Conversions performed routinely as per metric units 6. Problem solving processes are used to undertake the tasks as per workplace procedures. 7. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures 8. Information is recorded using mathematical language and symbols appropriate to discuss the task as per workplace procedures. |
| 1. Use routine maps and plans for work | 1. Features are identified in routine maps and plans as per SOPs 2. Symbols and keys in routine maps and plans are clearly explained as per SOPs 3. Orientation of map to North is identified and interpreted as per SOPs 4. Understanding of direction and location is clearly demonstrated as per SOPs 5. Simple scale is applied to estimate length of objects, or distance to location or object as per SOPs 6. Directions are given and received using both formal and informal language as per SOPs |
| 1. Interpret, draw and construct 2D and 3D shapes for work | 1. Two dimensional shapes and routine three dimensional shapes identified in everyday objects and in different orientations in accordance with job specifications 2. The use and application of shapes elaborately explained as per SOPs 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. Common angles identified in accordance with SOPs 5. Common angles in everyday objects are appropriately estimated as per SOPs 6. Formal and informal mathematical language are used to describe and compare common angles as per workplace procedures. 7. Common geometric instruments used to draw two dimensional shapes as per SOPs 8. Routine three dimensional objects constructed from given nets as per SOPs. |
| 1. Interpret routine tables, graphs and charts for work | 1. Routine tables, graphs and charts identified in predominately familiar texts and contexts as per tables and graph manuals 2. Common types of graphs and their different uses identified as per SOPs 3. Features of tables, graphs and charts identified as per workplace procedures 4. Information in routine tables, graphs and charts located and interpreted as per workplace procedures 5. Calculations are perform to interpret information as per SOPs 6. How statistics can inform and persuade interpretations is explained as per SOPs 7. Misleading statistical information is identified as per workplace procedures. 8. Information relevant to the workplace is discussed as per workplace procedures. |
| 1. Collect data and construct routine tables and graphs for work | 1. Features of common tables and graphs identified as per SOPs 2. Uses of ***different tables and graphs*** identified as per job specifications 3. Data and variables to be collected are determined as per workplace procedures. 4. The audience is determined as per the workplace procedures 5. Method of data collection is select as per job requirement 6. Data is collected as per SOPs 7. Information is collated in a table as per SOPs 8. Suitable scale and axes determined as per job specifications 9. Graph to present information is drafted and drawn as per SOPs 10. Data checked to ensure that it meets the expected results and context as per workplace procedures 11. Information is reported or discussed using formal and informal mathematical language as per workplace procedures |
| 1. Use basic functions of calculator | * 1. Keys are identified and used for ***basic functions on a calculator*** as per SOPs   2. Calculation is done using whole numbers, money and routine decimals and percentages as per SOPs   3. Calculation done with routine fractions and percentages as per SOPs   4. Order of operations is applied to solve multi-step calculations as per SOPs   5. Results are interpreted, displayed and recorded as per workplace procedures   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. 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 |
| 1. 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. Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages 2. Estimated, measured and calculated with routine metric measurements 3. Applied simple scale to estimate length of objects or distance to location or object 4. Used formal and informal mathematical language to describe and compare common angles 5. Used common geometric instruments to draw two dimensional shapes 6. Collected data and constructed routine tables and graphs 7. Used basic functions of calculator correctly |
| 1. Resource Implications | The following resources should be provided:   1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed in:   1. On the job 2. Off the job 3. Industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE DIGITAL LITERACY

**UNIT CODE:** MIN/OS/GEM/BC/03/5/A

**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. Concepts of ICT are determined in accordance with computer equipment 2. Classifications of computers are determined in accordance with manufacturers specification 3. ***Appropriate computer software*** is identified according to manufacturer’s specification 4. ***Appropriate computer hardware*** is identified according to manufacturer’s specification 5. Functions and commands ofoperating system are determined in accordance withmanufacturer’s specification |
| 1. Apply security measures to data, hardware, software in automated environment | 1. ***Data security and privacy are classified*** in accordance with the prevailing technology 2. ***Security threats*** areidentified, **and *control measures*** are applied in accordance with laws governing protection of ICT 3. Computer threats and crimes are detected in accordance with Information security management guidelines 4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT |
| 1. Apply computer software in solving tasks | 1. ***Word processing concepts***are applied in resolving workplace tasks, report writing and documentation as per job requirements 2. ***Word processing utilities*** are applied in accordance with workplace procedures 3. Worksheet layout is prepared in accordance with work procedures 4. Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures 5. Continuous data manipulated on worksheet is undertaken in accordance with work requirements 6. Database design and manipulation is undertaken in accordance with office procedures 7. Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures |
| 1. Apply internet and email in communication at workplace | 1. Electronic mail addresses are opened and applied in workplace communication in accordance with office policy 2. Office internet functions are defined and executed in accordance with office procedures 3. ***Network configuration*** is determined in accordance with office operations procedures 4. Official World Wide Web is installed and managed according to workplace procedures |
| 1. Apply desktop publishing in official assignments | 1. Desktop publishing functions and tools are identified in accordance with manufactures specifications 2. Desktop publishing tools are developed in accordance with work requirements 3. Desktop publishing tools are applied in accordance with workplace requirements 4. Typeset work is enhanced in accordance with workplace standards |
| 1. Prepare presentation packages | 1. Types of presentation packages are identified in accordance with office requirements 2. Slides are created and formulated in accordance with workplace procedures 3. Slides are edited and run in accordance with work procedures 4. Slides and handouts are printed according to work requirements |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical skills
* Interpretation
* Typing
* Communication
* 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. Identified and controlled security threats 2. Detected and protected computer crimes 3. Applied word processing in office tasks 4. Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 5. Opened electronic mail for office communication as per workplace procedure 6. Installed internet and World Wide Web for office tasks in accordance with office procedures 7. Integrated emerging issues in computer ICT applications 8. Applied laws governing protection of ICT |
| 1. Resource Implications | The following resources should be provided:   1. Tablets 2. Laptops 3. Desktop computers 4. Calculators 5. Internet 6. Smart phones 7. Operation Manuals |
| 1. Methods of Assessment | Competency may be assessed through:   1. Written Test 2. Observation 3. Practical assignment 4. Interview/Oral Questioning |
| 1. Context of Assessment | Competency may be assessed in:   1. Off the job 2. On the job setting 3. Industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE ENTREPRENEURIAL SKILLS

**UNIT CODE :** MIN/OS/GEM/BC/04/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

## DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/05/5/A

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* 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. Conducted self-management 2. Demonstrated interpersonal communication 3. Demonstrated critical safe work habits 4. Led small teams 5. Planned and organized work 6. Maintained professional growth and development 7. Demonstrated workplace learning 8. Demonstrated problem solving skills 9. Demonstrated workplace ethics |
| 1. Resource Implications | |  | | --- | | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place | |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Oral questioning 2. Portfolio of evidence 3. Third Party Reports 4. Written tests |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** MIN/OS/GEM/BC/06/5/A

**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. ***Storage methods*** for environmentally***hazardous*** materials are strictly followed according to environmental regulations and OSHS. 2. ***Disposal methods*** of hazardous wastes are followed always according to environmental regulations and OSHS. 3. ***PPE*** is used according to OSHS. |
| 1. Control environmental Pollution control | 1. Environmental pollution ***control measures*** are compiled following standard protocol. 2. Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999 3. Methods for minimizing ***noise pollution*** is complied with based on Noise and Excessive Vibration Pollution and Control Regulations, 2009 |
| 1. Demonstrate sustainable resource use | 1. Methods for minimizing wastage are complied with. 2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle) 3. Methods for economizing and reducing resource consumption are practiced as per the Environmental Management and Coordination Act 1999 |
| 1. Evaluate current practices in relation to resource usage | 1. Information on resource efficiency **systems and procedures** are collected and provided to the work group where appropriate. 2. Current resource usage is measured and recorded by members of the work group. 3. Current purchasing strategies are analyzed and recorded according to industry procedures. 4. Current work processes to access information and data is analyzed following enterprise protocol. |
| 1. Identify Environmental legislations/conventions for environmental concerns | 1. Environmental ***legislations/conventions*** and local ordinances are identified according to the different ***environmental aspects/impact*** 2. ***Industrial standard/environmental practices*** are described according to the different environmental concerns |
| 1. Implement specific environmental programs | 1. Programs/Activities are identified according to organizations policies and guidelines. 2. Individual roles/responsibilities are determined and performed based on the activities identified. 3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines 4. Stakeholders are consulted based on company guidelines |
| 1. Monitor activities on Environmental protection/Programs | 1. Activities are periodically monitored and evaluated according to the objectives of the environmental Program 2. Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations 3. Data gathered are analyzed based on evaluation requirements 4. Recommendations are submitted based on the findings 5. Management support systems are set/established to sustain and enhance the program 6. Environmental incidents are monitored and reported to 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 |
| 1. 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 |
| 1. Waste management procedures may include but not limited to: | * Sorting * Storing of items * Recycling of items * Disposal of items |
| 1. Resources may include but not limited to: | * Electric * Water * Fuel * Telecommunications * Supplies * Materials |
| 1. Workplace environmental hazards may include but not limited to: | * Biological hazards * Chemical and dust hazards * Physical hazards |
| 1. 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. Controlled environmental hazard 2. Controlled environmental pollution 3. Demonstrated sustainable resource use 4. Evaluated current practices in relation to resource usage 5. Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 6. Described industrial standard environmental practices according to the different environmental issues/concerns. 7. Resolved problems/ constraints encountered based on management standard procedures 8. Implemented and monitored environmental practices on a periodic basis as per company guidelines 9. Recommended solutions for the improvement of the Program 10. Monitored and reported to proper authorities any environmental incidents |
| 1. Resource Implications | The following resources should be provided:   1. Workplace with storage facilities 2. Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.) 3. PPE 4. Manuals and references 5. Legislation, policies, procedures, protocols and local ordinances relating to environmental protection 6. Case studies/scenarios relating to environmental Protection |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Interview/Third Party Reports 5. Portfolio of evidence |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** MIN/OS/GEM/BC/07/5/A

**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. ***Hazards*** in the workplace are identified ***based their indicators*** 2. Risks and hazards are evaluated based on legal requirements. 3. ***OSH concerns*** raised by workers are addressed as per legal requirements. |
| 1. Control OSH hazards | 1. Hazard prevention ***and control measures*** are implemented as per legal requirement. 2. Risk assessment is conductedand a risk matrix developed based on likely impact. 3. ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures. |
| 1. Implement OSH programs | 1. Company OSH program are identified, evaluated and reviewed based on legal requirements. 2. Company OSH programs are implemented as per legal requirements. 3. Workers are capacity built on OSH standards and procedures as per legal requirements 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 |
| 1. 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 |
| 1. 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 |
| 1. 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 |
| 1. 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 |
| 1. 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 |
| 1. 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 |
| 1. Contingency measures may include but are not limited to: | * Evacuation * Isolation * Decontamination * Emergency personnel |
| 1. 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 |
| 1. 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. |
| 1. 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 counseling methodologies and strategies

**EVIDENCE GUIDE**

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

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

# COMMON UNITS OF COMPETENCY

## UNDERSTAND GEOLOGY PRINCIPLES

**UNIT CODE:** MIN/OS/GEM/BC/01/5/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to understand geology principles It involves understanding rocks and minerals, mineral crystal systems, geology of Kenya, deposits and weathering of rocks and minerals

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes that make up workplace function. | **PERFORMANCE CRITERIA**  These assessable statements specify the required level of performance for each of the elements.  ***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Understand rocks and minerals | * 1. Identified different ***types of rocks*** according to mode of formation   2. Identified different ***types of rock forming minerals*** according to Bowen’s reaction series   3. Demonstrated properties of minerals based on scientific principles   4. Demonstrated formation of crystals based on scientific principles |
| 1. Understand mineral crystal systems | * 1. crystal formation is identified according to crystallization process   2. Identified different types of crystal systems according to bonding   3. Demonstrated understanding of crystals forms according to sketches   4. formation of silicates is identified according to polymerization process |
| 1. Understand geology of Kenya and region | * 1. geological time scale series is identified based on geological principles   2. Archean/ Greenstone belt rocks is identified based on geological principles   3. Pretozoic/ Mozambique Belt is identified based on geological principles   4. sedimentary basin of Coast region, North Eastern region, Rift Valley and the Kaviando Rift around L. Victoria is identified based on geological principles   5. tertiary and quaternary volcanic in the Rift Valley is identified based on geological principles   6. igneous intrusive in various parts of the country is identified based on geological principles |
| 1. Understanding ore deposits | * 1. Demonstrate knowledge of geology of Kenya based on mineral occurrence maps.   2. Mineralization environment is identified based on geological principles   3. ***Ore deposits*** are classified based on geological principles   4. Global tectonics are identified based on geological principles   5. Ore formation is identified based on geological principles   6. Ore genesis is identified based on geological principles |
| 1. Understand weathering of rocks and minerals | * 1. Weathering and erosion is differentiated based on the concept   2. Rock cycle is identified based on geological principles   3. Types of weathering are identified based on geological principles   4. Causes of weathering are identified based on geological principles.   5. Factors that affect weathering rates are identified based on geological principles |

**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. Types of rocks may include but not limited to: | * + Igneous rocks   + Sedimentary rocks   + Metamorphic rocks |
| 1. Types of rock forming minerals may include but not limited to: | * + Olivine   + Pyroxene   + Amphibole   + Mica   + Feldspar   + Quartz |
| 1. Types of crystal systems may include but not limited to: | * + Cubic   + Orthorhombic   + Monoclinic   + Hexagonal   + Triclinic   + Tetragonal |
| 1. Crystals forms may include but not limited to: | * + Prism   + Pyramid   + Cube   + Octahedron   + Tetrahexadron |
| 1. Ore deposits measures may include but not limited to: | * + Carbonatite   + Kimberlite   + Volcanic Massive Sulphite (VMS)   + SEDEX   + Skarn deposits |

**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:

* Critical thinking skills
* Observation skills
* Coordinating skills
* Communication skills
* Interpersonal skills
* Presentation skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of rocks
* Properties of minerals
* Crystallography
* Bowen reaction series
* Rock forming minerals
* Crystal systems
* Formation of silicates
* Greenstones belt rocks
* Mozambique belt
* Weathering and erosion
* Types of weathering
* Factors affecting weathering
* Basic geography
* National occurrence maps

**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. Understood rocks and minerals appropriately 2. Understood mineral crystal systems appropriately 3. Understood geology of Kenya appropriately 4. Understood ore deposits appropriately 5. Understood weathering of rocks and minerals appropriately |
| 1. Resource Implications | The following resources should be provided:  2.1 Workplace or assessment location  2.2 OSH personal records  2.3 PPE  2.4 Health records |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Portfolio Assessment  3.2 Interview  3.3 Case Study/Situation  3.4 Observation/Demonstration and oral questioning |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these.  Off the job, assessment must be undertaken in a closely simulated workplace environment or during industrial attachment. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# CORE UNITS OF COMPETENCY

## CARRYOUT GEMSTONE IDENTIFICATION

**UNIT CODE:** MIN/OS/GEM/CR/01/5/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to carry out gemstone identification. It involves performing thermal test, identifying gemstone colour, performing hardness test, identifying gemstone optical properties, performing specific gravity test, testing refractive index and conducting optical microscopic test.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes that make up workplace function. | **PERFORMANCE CRITERIA**  These assessable statements specify the required level of performance for each of the elements.  ***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Perform thermal test | * 1. Gemstone sample is obtained according to organizational procedures.   2. Gemstone is placed on back of your hand for 5 seconds to feel temperature according to ***thermal inertia principles***   3. Thermal temperature for gemstone is felt 2 to 3 times to confirm the results according to thermal inertial principles.   4. Results are documented according to standard operating procedures. |
| 1. Identify gemstone colour | * 1. Standard colour chart is obtained according to International Gemstone Society   2. Gemstone is obtained according to organizational procedures.   3. Gemstone is observed with naked eye against natural light according to standard operating procedures   4. Results are documented according to colour of gemstone |
| 1. Perform hardness test | * 1. Mohs hardness kit is obtained according to job specifications   2. Sample is scratched against known rough ***gemstone*** according to Moh’s hardness scale.   3. Results are recorded according to Moh’s hardness scale |
| 1. Identify gemstone optical properties | * 1. Sample is obtained according to organizational procedures.   2. ***Tools and equipment*** are obtained according to job specifications   3. Sample is illuminated for cracks, inclusions, bubbles and colour according to standard operating procedures   4. Results are recorded according to properties of the sample. |
| 1. Perform specific gravity test | * 1. Specific gravity is performed in a controlled environment to ensure accuracy of results according to SOPs.   2. Hydrostatic balance is operated according to manufacturer’s manual and SOPs   3. Weight of gemstone is recorded in air and also when suspended in water according to standard operating procedures.   4. A standard formula is used to calculate the SG for the given material (gemstones) accurately according to Archimedes’ principle.   5. The fluid being used is regularly changed according to SOPs.   6. SG results are documented and interpreted according to gem identification chart |
| 1. Test refractive index | * 1. Refractive index test is performed using refractometer according to manufacturer’s manual and SOP.   2. Personal safety is observed as per work procedures and OSHA 2007.   3. A reading from the refractometer is taken and recorded according to type of gemstone.   4. Results are interpreted according to gem identification chart |
| 1. Conduct optical microscopic test | * 1. Gemological microscope is calibrated and set up as per manufacturer’s manual.   2. Gemological microscope is used according to job specification.   3. Sample is mounted on the stage of the microscope according to standard operating procedures.   4. Sample is observed for ***inclusions***, fractures and basic ***mineralogy*** according job specifications.   5. Results are recorded according to properties of the specific sample. |

**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** |
| * Thermal inertia principles | * Degree of slowness with which the temperature of a body approaches that of its surrounding. |
| * Inclusions may include but not limited to: | * Cloud/Milky * Feather * Needle * Rutilated * Indented natural * Twinning wisps * Graining * Cavity * Pinpoints * Bearding |
| * Known gemstone may include but not limited to: | * Tsavorite * Rhodolite * Sapphire * Ruby * Aquamarine * Tanzanite * Emerald * Topaz * Opal * Tourmalines |
| * Illumination tools and equipment may include but not limited to: | * Beam/spot lights * Loupe * Gemological microscope |
| * Mineralogy may include but not limited to: | * Science of minerals that involves crystallographic properties, mineralogical properties of an area, rock properties |

**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:

* Operation of Gemmological equipment
* Observing gemstones under natural light
* Observing inclusions
* Interpreting colour charts and results
* Reading the refractrometer
* Ability to differentiate properties of gemstones
* Ability to sketch the diagrams and draw conclusion.
* Colour differentiation
* Analytical skills
* Interpreting moh scale

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Construction and usage of microscope
* Types, explanation and identification of different inclusions
* Thermal inertia principles.
* Identifying various tools and equipment’s for gemstone identification
* Gemstone identification tools and equipment
* Understand international gem standards
* Understand the Moh’s scale
* Characteristics and properties of gemstones
* Occupational safety and health standards
* Gem identification chart

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified natural gemstones correctly 2. Identified treated gemstones correctly 3. Identified imitation/ assembled gemstones correctly 4. Identified synthetic gemstones correctly 5. Identified gemstone colour correctly 6. Performed thermal test correctly 7. Tested refractive index of a stone correctly 8. Tested the hardness of a stone correctly 9. Tested the specific gravity correctly |
| 1. Resource Implications | The following resources should be provided:   * 1. Gemological microscope   2. Refractometer   3. Moh’s hardness scale   4. Loupe   5. Tweezers   6. Gem identification chart   7. samples   8. Beam light   9. Hydrostatic balance |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Practical  3.2 Written test  3.3 Case Study/Situation  3.4 Observation/Demonstration and oral questioning |
| 1. Context of Assessment | * 1. Competency may be assessed on the job, off the job or a combination of these.   2. Off the job, assessment must be undertaken in a closely simulated workplace environment.   3. During industrial attachment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## PERFORM GEMSTONE GRADING

**UNIT CODE:** MIN/OS/GEM/CR/02/5/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to perform gemstone grading. It involves grading gemstone by clarity, grading gemstone by cut, grading gemstone by colour, grading gemstone by carat weight.

**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. Grade gem stone by clarity | * 1. Samples are obtained according to organization procedures   2. Samples are observed under natural light for ***inclusions***, breaks, fractures and bubbles according to SOPs   3. ***Equipment and tools*** ***for clarity*** observations are acquired and set up according to user manual   4. Samples are observed on the loupe/magnifying lens according to SOP   5. Observations are recorded according to sample characteristic   6. Samples are graded according to clarity |
| 1. Grade gem stone by cut | * 1. Equipment for gem cutting are obtained according to manufacturer’s standards   2. Samples are collected according to institution specifications   3. Observe sample parameters according to the ***physical characteristics of the samples***   4. Diamond samples are observed according to brilliance and fire parameters   5. Samples are ***cut*** to different shapes and styles to enhance color, carat weight and clarity according to characteristics of the sample   6. Samples are graded according to cut   7. Graded samples are recorded according to respective observation made and workplace procedures. |
| 1. Grade gem stone by colour | * 1. Samples are collected according to institutions standards   2. ***Tools and equipment for colour grading*** are collected and calibrated according to user manual   3. Samples are observed under natural light, flash light and microscope according to job specification and characteristics of the sample   4. Results are recorded accordingly according to the respective observations made and SOPs   5. Samples are graded according to colour |
| 1. Grade by carat weight | * 1. Samples are obtained according to organizational standards   2. Analytical weighing balance is identified and calibrated according to user manual   3. Units of measurements are set in carats according to user manual.   4. Sample weight is taken according to SOPs   5. Readings are recorded according to SOPs   6. Samples are graded according to carat weight |

**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. Types of stone cut may include but is not limited to: | * Brilliant Cut * Step Cut * Mixed Cuts * Briolette Cut * Barion Cut * Modified Cuts * Fancy cuts * Cabochon cuts |
| 1. inclusions may include but is not limited to: | * Imbalance, symmetry and proportion. * Girdle Thickness and Unevenness * Fractures * Amber * Girdles with Sharp Edges. * Alignment of Crown and Pavilion |
| 1. Gem stone colour may include but is not limited to: | * Red Gemstones (Coral, Ruby, Fire opal etc.) * Orange Gemstones (Tourmaline etc.) * Yellow Gemstones (Beryl, Agate, Imperial Topaz) * Green Gemstones(Opal, Emerald) * Blue Gemstones (sapphire, Topaz) |
| 1. Clarity graded may include but is not limited to: | * TYPE 1 inclusion-free * TYPE 2 visible inclusions. * VVS- Very, very slightly Included Minute- inclusions * VS-Very Slightly Included Minor- inclusions * SI1- Slightly Included 1- inclusions * SI2- Slightly Included 2- inclusions * I1-Included 1- inclusions * I2-Included 2- inclusions * I3 Included 3- inclusions |
| 1. Color graded may include but not limited to: | * Colourless- D,E,F * Near colourless- G,H,I,J * Faint yellow-K, L,M * Very light yellow * Light yellow-N,O,P,Q,R * A * AA * AAA * Top B * B * BB * BBB |
| 1. Equipment and tools for clarity may include but is not limited to: | * Loupe * Flash light * Gemmology microscope * Magnifying |
| 1. Physical characteristics of the samples may include but is not limited to: | * Color * Fractures * Inclusions * Shape * Clarity |
| 1. Tools and equipment for colour grading may include but is not limited to: | * Gem Identification chart * Loupe * Polariscope * Gemmological microscope * Beam light |
| 1. Equipment for carat weight may include but is not limited to: | * Weighing scale |

**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:

* Ability to grade gemstones by color
* Ability to grade gemstones by cut
* Ability to grade gemstones by clarity
* Ability to grade gemstones by carat weight
* Ability to differentiate inclusions
* Operating gemmological instruments

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Safety work practices
* Clarity of gemstones.
* Inclusions
* Clarity grades
* Types of cuts.
* International standards of cuts.
* Usage of Vernier caliper.
* Colors of gemstones.
* Hue, tone, saturation of gemstones
* Carat weight
* Carat weight balance
* Procedure of operating carat balance scale.
* Required process resources
* Procedures for selecting, sorting and grading
* Quality standards
* Manual handling procedures
* Cleaning agents
* Organization procedures and policies
* Safety and environmental aspects of relevant organizations processes
* Workplace procedures
* Record keeping and management

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Graded gem stone by clarity correctly 2. Graded gem stone by cut correctly 3. Graded gem stone by colour correctly 4. Graded gemstone by carat weight correctly |
| 1. Resource Implications | The following resources should be provided:   * 1. Tweezers   2. Loupe   3. Light source   4. Polariscope   5. Refractometer   6. Microscope   7. Weighing Balance   8. Gemstone (Pearl, Coral, Amber)   9. Gemstone Identification Chart |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Portfolio Assessment   2. Case Study/Situation   3. Observation/Demonstration and oral questioning   4. Written exam |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these.  Off the job assessment must be undertaken in a closely simulated workplace environment or during industrial attachment. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## CARRY OUT GEMSTONE PROCESSING

**UNIT CODE:** MIN/OS/GEM/CR/03/5/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to carry out gemstone processing stones. It involves identifying gemmological stones, performing gemstone cutting, conducting gemstone pre-shaping, performing gemstone faceting, performing gemstone polishing and performing gemstone treatment.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes that make up workplace function. | **PERFORMANCE CRITERIA**  These assessable statements specify the required level of performance for each of the elements.  ***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Identify gemological stones | * 1. Specific gemstone is obtained according to organisational procedures   2. Gem ***identification tests*** are carried out according to job specifications.   3. ***Personal safety precautions*** are observed as per work requirements and OSHA 2007   4. Results are interpreted according to ***gem identification chart.*** |
| 1. Conduct gemstone pre-shape | 1. Gemstone is obtained according to organisational procedures 2. Gem faceting machine is operated according to the manufacturer’s manual and SOP 3. Personal safety is observed as per work procedures and OSHA 2007.    1. Gemstone is pre-shaped according to its size and shape of the gemstone |
| 1. Perform gemstone cutting | * 1. Gemstone is obtained according to organisational procedures   2. Personal safety is observed as per work procedures and OSHA 2007.   3. ***Gem faceting machine*** is operated according to manufacturer’s manual and SOP   4. Gemstone is examined and illuminated to identify inclusions and cracks according to the sample properties   5. Gemstone is cut according to the optical and physical properties |
| 1. Perform gemstone polishing | * 1. Gem is obtained according to organisational procedures   2. Gem faceting machine is operated according to manufacturer’s manual and SOP   3. Personal safety is observed as per work procedures and OSHA 2007   4. Gem ***polishing powder*** is obtained according to job specifications   5. Gem is polished as per the job specification |
| 1. Perform gemstone treatment | * 1. Gem is obtained according to organisational procedures   2. Personal safety is observed as per work procedures and OSHA 2007   3. Type of Gem treatment is identified as per the job requirements   4. ***Tools, equipment and reagents*** are obtained as per the type of treatment to be used   5. Gem ***treatment*** is done according to its properties and job specification |

**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. Identification tests may include but is not limited to: | * Thermal test * Illumination * Specific gravity * Optical microscopy |
| 1. Gem identification chart may include but is not limited to: | * International reference chart developed by IGS for gemstone identification and classification |
| 1. Gem faceting machine/Plate may include but is not limited to: | * Crystalite plates 600, 293 * Tin lap 600, 293 |
| 1. Cuts may include but is not limited to | * Brilliant * Step cuts * Free forms * Cabochon * Cushion * Pavillion * Crown * Giddle |
| 1. Polishing powder may include but is not limited to | * Grit/Carborandum of different mesh |
| 1. Treatment may include but not limited to | * Heating/Enhancement * Chemical * Irradiation * Surface coating * Bleaching * Cavity fillings * Dyeing * Fracture filling |
| 1. Tools, equipment and reagents may include but not limited to: | * Dye * Bleaching agents * Sugar and smoke treatment * Fillers * Electromagnetic radiation |

**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:

* Operation of Gemmological equipment
* Identifying gemstones under natural light
* Ability to differentiate properties of gemstones
* Ability to apply different types of cuts
* Ability to sketch the diagrams and draw conclusion.
* Colour differentiation
* Analytical skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Crystallography
* Use of Gem faceting machine
* Types, characteristics and properties of gemstone
* Types of cuts
* Values of refractive index.
* RI of different gemstones.
* Procedure of using RI meter.
* Safety precautions
* Gemstone hardness.
* Moh’s scale of hardness.
* Specific gravity values of different gemstones.
* Use of hydrostatic balance.
* Inclusion of natural and synthetic gemstone.
* Handling microscope.
* Loupe
* Behaviour of different gems under different light conditions
* Operating UV lamp

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified gemmological stone correctly 2. Carried out gemstone identification tests correctly 3. Performed gemstone cutting correctly 4. Operated the gem faceting machine correctly 5. Observed personal safety when cutting appropriately 6. Conducted gemstone pre-shaping correctly 7. Performed gemstone faceting correctly 8. Performed gemstone polishing correctly 9. Performed gemstone treatment correctly |
| 1. Resource Implications | The following resources should be provided:   * 1. Gemstone sample   2. Gem velvet cloth   3. Microscope   4. Refractometer   5. Dichroscope   6. Polariscope   7. Tweezers or a gem holder   8. Callipers or a micrometre   9. Moh’s Scale   10. Light source   11. Hydrostatic balance beam scale   12. Heavy liquids   13. Loupe(10x)   14. Crystal models   15. Refractive index fluid   16. Samples of rough & cut gemstone   17. Gem faceting machine   18. Gem polishing plates   19. Caborandum and grit   20. Treatment chemicals and heat source |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Practical Assessment   2. Written   3. Case Study/Situation   4. Observation/Demonstration and oral questioning |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment or during industrial attachment. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## CRAFT JEWELLERY PRODUCTS

**UNIT CODE:** MIN/OS/GEM/CR/04/5/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to design jewellery products. It involves identifying required materials , crafting jewellery product, conducting jewellery finishing and packaging finished products

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the key outcomes that 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 required materials | * 1. Specific ***jewellery materials*** are obtained according to organisational procedures   2. Tools and equipment are identified and prepared for use based on job requirements.   3. The jewellery design is obtained according to organisational procedures. |
| 1. Craft jewellery products | * 1. The jewellery design is examined for details according to design provided.   2. Personal safety is observed according to OSHA 2007.   3. ***Crafting tools and equipment*** are identified and gathered based on standard operating procedures.   4. Materials are cut, moulded or soldered as per the design requirements   The design is ***implemented*** as per specifications. |
| 1. Conduct jewellery finishing | * 1. Jewellery ***finishing*** is done based on designs and workplace policy.   2. Mounting tools and consumables are identified and gathered based on standard operating procedures   3. Gemstone is mounted on the jewellery according to design requirements |
| 1. Package jewellery products | * 1. Packaging materials are identified and gathered according to standard operating procedures.   2. Care and handling of jewellery is observed based on organizational procedures   3. Jewellery is packaged based on design and size of product and how delicate the gemstone is.   4. Storage and security of jewellery products is observed according organizational 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. Jewellery materials may include but is not limited to: | * Gemstones * Precious Metals * Non-precious metal * Alloys |
| 1. Crafting tools and equipment may include but is not limited to: | * Cutting tools * Pliers * Smelters * Files * Fasteners * Polishing tools * Bending tools |
| 1. Implementing procedures may include but is not limited to: | * Cutting * Soldering * Molding |
| 1. Finishing may include but is not limited to: | * Coating * Polishing * Spraying * Electroplating |
| 1. Jewellery polishing tools may include but is not limited to: | * Rubber abrasive wheels * Sanding disks and wheels * Magnetic polishers and tumblers * Jewellery polishing compounds * Jewellery buffs * Grinding and Satin finish wheels * Cratex polishing wheels |

**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:

* Identifying precious metals, semi-precious and gemstones
* Sketching
* Alloying/ plating
* Jewelry finishing
* Designing
* Qualifying and quantifying
* Valuation
* Packaging and staging
* exhibition

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Develop sources of inspiration
* Understand jewelry design theory and artistry
* Illustrate shape, form, and texture of metal
* Render faceted gems, pearls, colored metals, etc.
* Learn traditional drafting techniques
* Develop motifs to create sketches of jewelry objects
* Create a portfolio of class projects and custom designs that is ready for presentation to potential clients and employers
* Safe work practices and procedures and use of personal protective equipment (PPE)
* Design resources and where to locate them
* Research techniques and available resources
* Social trends, cultural, environmental and social context
* Relevant industry literature and applicable industry standards or regulations
* Existing designs, ethical and competitive considerations
* Brainstorming techniques for research and idea development
* Design principles
* Design documentation
* Form drawing development
* Geometric forms and drawing techniques
* Enhancement techniques
* Available manufacturing technologies and their suitability for jewellery manufacture
* Types of working drawings and their uses
* Interrelation between technical and design drawings
* Industry requirements and availability of industry expertise.
* Outline intellectual property considerations when producing jewellery work
* Outline methods of exploring techniques to achieve different effects in jewellery
* Summaries the main aspects of historical and contemporary jewellery-making practice and how they can inform own design ideas
* Describe, for the elements and principles of design, the key characteristics, key interrelationships and use in jewellery
* Summarize, for a range of tools and equipment used to produce jewellery, key physical features and uses, cleaning and maintenance techniques and storage requirements
* describe the physical properties and capabilities of a range of materials and techniques used to produce jewellery
* Discuss typical work space requirements for producing jewellery including ways of organizing space and equipment for efficient work operation
* Describe procedures for working safely with jewellery materials, tools and equipment.

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified and selected appropriate tools and equipment for crafting appropriately 2. Examined jewellery design appropriately 3. Observed personal safety appropriately 4. Cut, mouldered and soldered appropriately 5. Implemented and finished jewellery design correctly 6. Polished jewellery using appropriate tools correctly 7. Packaged the jewellery with appropriate packaging materials appropriately 8. Cared and handling of jewellery is observed correctly |
| 1. Resource Implications | The following resources should be provided:   * 1. Cutting tools   2. Pliers   3. Smelters   4. Files   5. Fasteners   6. Polishing tools   7. Bending tools   8. Gemstones   9. Precious Metals   10. Non-precious metal   11. Alloys |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Portfolio Assessment  3.2 Interview  3.3 Case Study/Situation  3.4 Observation/Demonstration and oral questioning |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment or during industrial attachment. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |