

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**GEMOLOGY TECHNICIAN**

**LEVEL 4**



**TVET CDACC**

**P.O. BOX 15745-00100**

**NAIROBI**

First published 2019

© 2019, Ruiru Gikonyo Memorial Institute for Technical Skills.

All rights reserved. No part of these Occupational Standards may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the RMG Memorial Institute for Technical Skills, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the Program Director RMG Foundation at the address below:

RG Memorial Institute for Technical Skills

Kedong’ House Lenana Road, 3rd floor, room 10

P.O. Box 53983-00200

Nairobi, Kenya

Mobile: +245722512075/+254722308272

Email: [wacho@iconnect.co.ke](mailto:wacho@iconnect.co.ke)

# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement 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 4. 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 occupational standards will be the bases for development of competency based curriculum for Gemmology Level 4. These Standards will also be the bases for assessment of an individual for competence certification.

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

I am grateful to the Council Members, Council Secretariat, 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 that 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 Gemmology 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/01/4/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control version

# TABLE OF CONTENTS

[FOREWORD ii](#_Toc30382211)

[PREFACE iii](#_Toc30382212)

[ACKNOWLEDGMENT iv](#_Toc30382213)

[ACRONYMS v](#_Toc30382214)

[KEY TO UNIT CODE vi](#_Toc30382215)

[TABLE OF CONTENTS vii](#_Toc30382216)

[OVERVIEW viii](#_Toc30382217)

[BASIC UNITS OF COMPETENCY 1](#_Toc30382218)

[DEMONSTRATE COMMUNICATION SKILLS 2](#_Toc30382219)

[DEMONSTRATE NUMERACY SKILLS 6](#_Toc30382220)

[DEMONSTRATE DIGITAL LITERACY 12](#_Toc30382221)

[DEMONSTRATE ENTREPRENEURIAL SKILLS 17](#_Toc30382222)

[DEMONSTRATE EMPLOYABILITY SKILLS 23](#_Toc30382223)

[DEMONSTRATE ENVIRONMENTAL LITERACY 29](#_Toc30382224)

[DEMONSTRATE OCUPATIONAL SAFETY AND HEALTH PRACTICES 34](#_Toc30382225)

[COMMON UNITS OF COMPETENCY 40](#_Toc30382226)

[UNDERSTAND GEOLOGY PRINCIPLES 41](#_Toc30382227)

[CORE UNITS OF COMPETENCY 46](#_Toc30382228)

[CONDUCT MINE BLASTING 47](#_Toc30382229)

[CARRYOUT GEMSTONE IDENTIFICATION 52](#_Toc30382230)

[PERFORM GEMSTONE GRADING 57](#_Toc30382231)

[CARRY OUT GEMSTONE PROCESSING 63](#_Toc30382232)

[CRAFT JEWELLERY PRODUCTS 68](#_Toc30382233)

# OVERVIEW

Gemmology Technician Level 4 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 4 qualifications include the following:

**BASIC COMPETENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/BC/01/4/A | Demonstrate communication skills |
| MIN/OS/GEM/BC/02/4/A | Demonstrate numeracy skills |
| MIN/OS/GEM/BC/03/4/A | Demonstrate digital literacy |
| MIN/OS/GEM/BC/04/4/A | Demonstrate entrepreneurial skills |
| MIN/OS/GEM/BC/05/4/A | Demonstrate employability skills |
| MIN/OS/GEM/BC/06/4/A | Demonstrate environmental literacy |
| MIN/OS/GEM/BC/07/4/A | Demonstrate occupational safety and health practices |
| **COMMON COMPENTENCIES** | |
| MIN/OS/GEM/CC/01/4/A | Understand geology principles |

**CORE COMPENTENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/CR/01/4/A | Conduct mine blasting |
| MIN/OS/GEM/CR/01/4/A | Carryout gemstone identification |
| MIN/OS/GEM/CR/02/4/A | Perform gemstone grading |
| MIN/OS/GEM/CR/03/4/A | Carry out gemstone processing |
| MIN/OS/GEM/CR/04/4/A | Craft jewellery products |

# BASIC UNITS OF COMPETENCY

## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/01/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required demonstrate communication skills. It involvesobtaining and conveying workplace information, completing relevant work-related documents, communicating information about workplace processes, leading workplace discussion and communicating workplace issues.

**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. Obtain and convey workplace information | 1. Specific and relevant information is accessed from ***appropriate sources*** based on standard procedures 2. Effective questioning, active listening and speaking skills are used to gather and convey information based on communication needs 3. Appropriate ***medium*** is used to transfer information and ideas in accordance with workplace guidelines 4. Appropriate non- verbal communication is used as per the communication needs 5. Appropriate lines of communicationwith supervisors and colleagues are identified and followed based on workplace requirements 6. Location and storage of information is undertaken according to workplace procedures    1. Personal interaction is carried out clearly and concisely according to workplace requirements |
| 1. Complete relevant work-related documents | * 1. Range of forms relating to conditions of employment are completed according to workplace procedures   2. Workplace data is recorded based on workplace requirements   3. Errors in recording information are identified and acted upon in accordance with workplace policies   4. Reporting requirements are completed according to organizational guidelines |
| 1. Communicate information about workplace processes | 1. Information sources are identified according to workplace procedures 2. ***Methods of communication*** are selected based on workplace guidelines 3. Multiple operations are communicated according to workplace structure 4. Work-related questions are asked and responded based on set protocols 5. Information is selected and organized according to workplace requirements 6. Verbal and written reporting is undertaken as per workplace requirements 7. Communication is maintained according to workplace standards |
| 1. Lead workplace discussions | 1. Response to workplace issues is sought and provided as per workplace protocol 2. Constructive contributions are made based on ***workplace discussions*** 3. Workplace objectives and action plan are communicated according to workplace requirements |
| 1. Identify and communicate issues arising in the workplace | 1. Issues and problems are identified as per workplace guidelines 2. Problems and issues in the workplace are organized according to workplace operations 3. Dialogue is initiated with appropriate personnel as per workplace structure 4. Problems and issues raised are communicated as per the workplace reporting procedures |

**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. Methods of communication mayinclude but not limited to: | * Non-verbal gestures * Verbal * Face to face * Two-way radio * Speaking to groups * Using telephone * Written * Internet |
| 1. Workplace discussion may include but not limited to: | * Coordination meetings * Toolbox discussion * Peer-to-peer discussion |

**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
* Active listening
* Interpretation
* Negotiation
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Organization requirements for written and electronic communication methods
* Effective verbal communication methods
* Report writing
* Effective questioning techniques (clarifying and probing)
* Workplace etiquette

**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. Dealt with a range of communication/information at one time 2. Made constructive contributions in workplace issues 3. Sought workplace issues effectively 4. Responded to workplace issues promptly 5. Presented information clearly and effectively in written form 6. Used appropriate sources of information 7. Asked appropriate questions 8. Provided accurate information |
| 1. Resource Implications | 1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | 1. Third-party reports 2. Portfolio 3. Interview 4. Written tests 5. Observation 6. Oral questioning |
| 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/02/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate numeracy skills. It involves identifying and using whole numbers and simple fractions, decimals and percentages for work, identifying, measuring and estimating familiar quantities for work, reading and using familiar maps, plans and diagrams for work, identifying and describing common 2D and some 3D shapes for work, constructing simple tables and graphs for work using familiar data and identifying and interpreting information in familiar tables, graphs and charts for work.

**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 and use whole numbers and simple fractions, decimals and percentages for work | | 1. Simple fractions, decimals and percentages identified and interpreted as per standard operating procedures. 2. Understanding of place value by organising numbers from smallest to largest demonstrated as SOPs 3. Required numerical information located and decision made on appropriate method to solve a problem as per SOPs 4. Limited range of calculations performed using the four operations using SOPs 5. Links between operations described as per SOPs 6. Estimations made to check reasonableness of results of problem-solving process as SOPs 7. Numerical information recorded, and the result of the task communicated using informal and some formal language and symbolism as per workplace procedures |
| 1. Identify, measure and estimate familiar quantities for work | 1. Measurement information in workplace tasks and texts identified and interpreted as per workplace procedures. 2. Familiar units of measurement needed for tasks is identified as per measurements manuals/charts 3. Familiar and simple amounts estimated as per workplace procedures. 4. Appropriate measuring equipment selected as per SOPs 5. ***Simple measuring equipment*** graduated in familiar units to measure relevant quantities is used as per graduation manuals. 6. Calculation done using familiar units of measurement as per SOPs 7. Measurements and results checked against estimates as per job specifications. 8. Results are recorded or reported as per workplace procedures 9. Results relevant to the workplace task are communicated using informal and some formal mathematical and general language as per workplace procedures. |
| 1. Read and use familiar maps, plans and diagrams for work | 1. Items and places are in familiar maps, plans and diagrams as per SOPs 2. Common symbols and keys recognised in familiar maps, plans and diagrams as per SOPs 3. Understanding of direction and location demonstrated by describing the location of objects, or route to familiar places as per SOPs 4. Instructions to locate familiar objects or places are given and followed as per SOPs 5. Informal and some formal oral mathematical language and symbols are used as per SOPs |
| 1. Identify and describe common 2D and some 3D shapes for work | 1. ***Common 2D shapes and some common 3D shapes*** in familiar situations are identified and named as per job requirements 2. Common 2D shapes and designs are compared and classified as per SOPs 3. Informal and some formal language used to describe common two-dimensional shapes and some common three-dimensional shapes in accordance with workplace procedures. 4. Simple items used to draw or construct common 2D shapes as per workplace procedures. 5. Common 3D shapes matched to their 2D sketches or nets as per SOPs |
| 1. Construct simple tables and graphs for work using familiar data | 1. Common types of graphs are identified and named as per SOPs 2. Familiar data to be collected is determined in accordance with job specifications. 3. A method to collect data is selected in accordance with workplace procedures. 4. A small amount of simple familiar data is collected as per workplace procedures 5. One or two variables determined from the data collected as per SOPs. 6. Data ordered and collated as per standard operating procedures. 7. A table is constructed and data entered as per SOPs 8. Graphs are constructed using data from table as per job specifications 9. Results are promptly checked as per workplace procedures 10. Graph information related to work is reported or discussed using informal and some formal mathematical and general language as per workplace procedures |
| 1. Identify and interpret information in familiar tables, graphs and charts for work | 1. Simple tables are identified in familiar texts and contexts in accordance with workplace procedures 2. Title, headings, rows and columns located in familiar tables as per SOPs 3. Information and data in simple tables identified and interpreted as per workplace procedures. 4. Information is related in accordance with workplace tasks 5. Familiar graphs and charts are identified in familiar texts and contexts as per SOPs 6. Title, labels, axes, scale and key from familiar graphs and charts are located as per SOPs 7. Information and data in familiar graphs and charts are identified and interpreted as per job requirements 8. Information is related to relevant workplace tasks as per job 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. Simple measuring equipment may include but not limited to: | * Rulers * Watches/clocks * Scales * Thermometers * AVO meter |
| 1. Common 2D shapes and common 3D shapes may include but not limited to: | * Round * Square * Rectangular * Triangle * Sphere * Cylinder * Cube * Polygons * Cuboids |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* 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. Simple fractions, decimals and percentages are correctly identified and interpreted   2. Performed a limited range of calculations using the 4 operations   3. Performed calculations using familiar units of measurement   4. Recognised common symbols and keys in familiar maps, plans and diagrams   5. Constructed simple tables and graphs using familiar data   6. Identified and interpret information in familiar tables, graphs and charts |
| 1. Resource Implications | 1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Written Test 2. Interview 3. Oral Questioning |
| 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 DIGITAL LITERACY

**UNIT CODE:** MIN/OS/GEM/BC/03/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate digital literacy in a working environment. It entails identifying computer software and hardware, applying security measures to data, hardware, software, applying computer software in solving task sand applying internet and email in communication at workplace.

**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 computer software and hardware | * 1. ***Appropriate computer software*** is identified according to manufacturer’s specification   2. ***Appropriate computer hardware*** is identified according to manufacturer’s specification |
| 1. Apply security measures to data, hardware, software | * 1. ***Data security and privacy are classified*** in accordance with the technological situation   2. ***Security and control measures*** are applied in accordance with laws governing protection of ICT   3. Computer threats and crimes are detected as per 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. Basic word processing concepts are applied in resolving workplace tasks   2. Word processing utilities are applied in accordance with workplace procedures   3. Data is manipulated on worksheet in accordance with office procedures |
| 1. Apply internet and email in communication at workplace | * 1. Electronic mail is applied in workplace communication in accordance with office procedures   2. Office internet functions are defined and executed in accordance with office procedures   3. Network configuration and uses are determined in accordance with office operations 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.

|  |  |
| --- | --- |
| **Range** | **Variable** |
| 1. Appropriate computer software may include but not limited to: | * Operating system * MS office * Web browser * Media players |
| 1. Appropriate computer hardware may include but not limited to: | * Computer Case * Monitor * Keyboard * Mouse * Hard Disk Drive * Motherboard * Video Card |
| 1. Data security and privacy may include but not limited to: | * Confidentiality * Cloud computing * Confidentiality * Cyber terrorism * Integrity -but-curious data serving |
| 1. Security and control measures may include but not limited to: | * Countermeasures and risk reduction * Cyber threat issues * Risk management |

**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
* Interpretation
* Typing
* Communication
* Computing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Input and output devices
* Central processing Unit (CPU)
* Peripherals
* Storage Media
* Software concept
* Types of concept
* Function of computer software
* Data security and privacy
* Security threats and control measures
* Computer crimes
* Detection and protection of computer crimes
* Laws governing protection of ICT
* Word processing;
* Functions and concepts of word processing.
* Documents and tables creation and manipulations
* Mail merging
* Word processing utilities
* Spread sheet;
* Meaning, formulae, function and charts, uses, layout, data manipulation and application to cell
* Networking and Internet;
* Meaning, functions and uses of networking and internet.
* Electronic mail and world wide web
* Emerging trends and issues in ICT;
* Identify and apply emerging trends and issues in ICT
* Challenges posed by emerging trends and issues

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   * 1. Identified input, output, CPU and storage media devices of computers in accordance to computer specification   2. Identified concepts, types and functions of computer software according to operation manual   3. Identified and controlled security threats   4. Detected and protected computer crimes   5. Applied word processing in office tasks   6. Prepared work sheet and applied data to the cells in accordance to workplace procedures   7. Used Electronic Mail for office communication as per workplace procedure   8. Applied internet and World Wide Web for office tasks in accordance with office procedures   9. Applied laws governing protection of ICT |
| 1. Resource Implications | * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Written tests   2. Practical assignment   3. Interview   4. Oral Questioning   5. Observation |
| 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 ENTREPRENEURIAL SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/04/4/A

**UNIT DESCRIPTION**

This unit covers the competencies required demonstrate entrepreneurial skills. It involvescreating and maintaining small scale business, establishing small scale business customer base, managing small scale business and growing/ expanding small scale business.

**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. Create and maintain small scale business | 1. Generation and evaluation of business ideas is undertaken in accordance with the existing procedure 2. Competencies are matched with business opportunities in accordance with business practices. 3. Procedure for starting a small business is identified as per the legal requirements 4. SWOT/ PESTEL analysis and or industrial survey is carried out according to office procedures 5. ***Business operations*** are monitored and controlled following established procedures. 6. Quality assurance measures are implemented in accordance with the business practices. 7. Good relations are maintained with staff/workers as per the workplace policies. 8. Policies and procedures on occupational safety and health and environmental concerns are constantly observed as per the workplace policies |
| 1. Establish small scale business customer base | 1. Good customer relations are maintained in accordance with office procedures 2. New customers and markets are identified, explored and reached out to according to the marketing plan 3. Promotions/Incentives are offered to loyal customers in accordance with office procedures 4. Additional products and services are evaluated and tried in accordance with marketing strategy 5. Customer record is maintained in accordance with office procedures |
| 1. Manage small scale business | 1. Enterprise is built up and sustained in line with judicious control of cash flows. 2. Profitability of enterprise is ensured as per the internal controls. 3. Unnecessary or lower-priority expenses and purchases are avoided as per the marketing strategy 4. Basic cost-benefit analysis are undertaken in accordance with office procedures 5. Basic financial management are undertaken in accordance with office procedures 6. Basic financial accounting in undertaken in accordance with office procedures 7. Business ***internal controls*** are implemented in accordance with office procedure 8. Setting business priorities and strategies is carried out according to office procedures 9. Preparation and interpretation of basic financial statements is undertaken in accordance with set procedures 10. Preparation of business plansfor small business is undertaken in accordance with ***business strategy*** 11. Business Social Responsibility is maintained in accordance with Standard Operations Procedures (SOP) |
| 1. Grow/ expand small scale business | 1. Prepared business growth strategy for small sale business in accordance with office procedures 2. Incorporated technology in small scale business growth in accordance with technological trends 3. Emerging issues and trends are considered in accordance with business growth strategy 4. Built audience interest in product/service according to growth strategy 5. Boosted cooperate communication according to business ***communication strategy*** |

**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. Business operations may include but not limited to: | * Purchasing * Accounting/administrative * Work production/operations/sales * Marketing |
| 1. Internal control may include but not limited to: | * Accounting systems * Financial statements/reports * Cash management * Human resource management |
| 1. Business Strategy may include but not limited to: | * Management of wastages * Environmental Conservation |
| 1. Communication strategy may include but not limited to: | * Blue print of exchange of information * Technology and exchange of information |

**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:

* Marketing
* Advertising
* Basic bookkeeping
* Accounting
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Generation and evaluation of business ideas
* Legal requirements for starting a small business
* SWOT/ PESTEL analysis
* Occupational Safety and Health
* Public relations concepts
* Business plan
* Business financing
* Marketing strategies
* Business management and control
* Production/ operation process
* Product promotion strategies
* Market and feasibility studies
* Business ethics
* Building customer relations
* Business models and strategies
* Types and categories of businesses
* Business internal controls
* Relevant national and local legislation and regulations
* Basic quality control and assurance concepts
* Building relations with customer and employees
* Building competitive advantage of the enterprise
* Business growth 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. Demonstrated entrepreneurial skills 2. Demonstrate competencies to create a small-scale business 3. Demonstrated ability to conceptualize and plan a micro/small business 4. Grew customer base for the small-scale business 5. Demonstrated ability to manage/operate a micro/small-scale business 6. Demonstrated competencies to grow a micro/small-scale business | |
| 1. Resource Implications | |  | | --- | | The following resources should be provided: |  1. Assessment location 2. Case studies on micro/small-scale enterprises 3. Assessment materials |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   |  |  | | --- | --- | | 1. Written tests 2. Observation 3. Oral questioning 4. Portfolio 5. Projects |  | |
| 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/05/4/A

**UNIT DESCRIPTON**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and 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 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. 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 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. Personal objectives may include but not limited to: | * Long term * Short term * Broad * Specific |
| 1. Feedback may include but not limited to: | * Verbal * Written * Informal * Formal |
| 1. Team may include but not limited to: | * Small work group * Staff in a section/department * Inter-agency group |
| 1. Drug and substance abuse may include but not limited to: | * Alcohol * Tobacco * Miraa * Over-the-counter drugs * Cocaine * Bhang * Glue |
| 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 |
| 1. Innovation may include but not limited to: | * New ideas * Original ideas * Different ideas * Methods/procedures * Processes * New tools |

**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
* Critical thinking
* Observation
* Organizing
* Record keeping
* Problem solving
* Decision Making
* Resource utilization

**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
* Record keeping
* Workplace problems and how to deal with them
* Assertiveness
* Team work
* HIV and AIDS
* Drug and substance abuse
* 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 critical safe work habits   3. Demonstrated workplace learning   4. 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/06/4/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution, demonstrating sustainable resource use and evaluating current practices in relation to resource usage.

**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 followed according to environmental regulations and OSHS.   2. Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS.   3. ***PPE*** is used according to OSHS. |
| 1. Control environmental pollution | * 1. ***Environmental pollution*** ***control measures*** are compiled following standard protocol.   2. Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999   3. Methods for minimizing noise pollution complied following environmental regulations. |
| 1. Demonstrate sustainable use of resource s | * 1. Methods for minimizing wastage are complied with.   2. ***Waste management procedures*** are employed following principles of 3Rs (Reduce, Reuse, Recycle)   3. Methods for economizing or reducing resource consumption are practiced. |
| 1. Evaluate current practices in relation to resource usage | * 1. Information on resource efficiency ***systems and procedures*** are collected and provided as per work groups/sector   2. ***Current resource usage*** is measured and recorded as per work group/sector   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 |

**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 are not limited to: | * Masks * Gloves * Goggles * Safety hat * Overall * Hearing protector * Safety boots |
| 1. Environmental pollution control measures may include but are not limited to: | * Methods for minimizing or stopping spread and ingestion of airborne particles * Methods for minimizing or stopping spread and inhaling gases and fumes * Methods for minimizing or stopping spread and ingestion of liquid wastes |
| 1. Waste management procedures may include but are not limited to: | * Sorting * Storing of items * Recycling of items * Disposal of items * Handling * Transport |
| 1. Current resources usage may include but are not limited to: | * Electric * Water * Fuel * Telecommunications * Supplies * Materials |

**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
* Recording
* Analytical
* Monitoring
* Writing
* Communication

**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
* Principle of 3Rs
* Types of resources
* Techniques in measuring current usage of resources
* Calculating current usage of resources
* Types of workplace environmental hazards
* Environmental regulations
* Environmental regulations applying to the enterprise.
* Procedures for assessing compliance with environmental regulations.
* Collection of information on environmental and resource efficiency systems and procedures,
* Measurement and recording of current resource usage
* Analysis and recording of current purchasing strategies.
* Analysis current work processes to access information and data Analysis of data and information

**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 hazards 2. Controlled environmental pollution 3. Demonstrated sustainable resource use 4. Evaluated current practices in relation to resource usage |
| 1. Resource Implications | The following resources should be provided:   * 1. Workplace with storage facilities   2. Tools, materials and equipment relevant to the tasks (e.g. cleaning tools, cleaning materials, trash bags, etc.)   3. PPEs   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 tests 4. Third party reports 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 OCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** MIN/OS/GEM/BC/07/4/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to practice safety and health and comply with OSH requirements relevant to work. It involves observing workplace procedures for hazards and risk prevention and participating in arrangements for workplace safety and health maintenance.

**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. Adhere to workplace procedures for hazards and risk prevention | 1. Arrangement of work area and items in accordance with workplace procedures requirements 2. Work standards and procedures are followed based on instructions 3. ***Prevention and control measures*** are applied based on instructions |
| 1. Participate in arrangements for workplace safety and health maintenance | 1. Orientations on ***OSH requirements and regulations*** is undertaken in line with policy. 2. Feedback on occupational health and safety are provided as per workplace instructions. 3. Workplace procedures for reporting hazards, incidents, injuries and sickness are adhered to as per workplace policy. 4. ***OSH-related training needs*** are identified and proposed as per workplace policy. |

**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. 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. 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 requirements / regulations may include but are not limited to: | * Building code * Permit to Operate |
| 1. OSH-related trainings may include but are not limited to: | * Safety Orientations relevant to tasks * Safe and Correct Operation of Tools and Equipment * Health Orientations/trainings * Prevention and Control of OSH Hazards in the workplace * Chemical Handling * Safety Trainings * Prevention and Control of Work-related Injuries and Illness * Basic First-aid Trainings * Emergency Response Trainings * Trainings on use of fire-extinguisher |

**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
* Knowledge management
* Collaborating
* Interpersonal
* Troubleshooting
* Critical thinking
* Observation

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* General OSH principles and legislations
* Principles of good housekeeping (5S)
* Company/workplace policies/ guidelines
* Standards and safety requirements of work process and procedures
* Standard Workplace emergency plan and procedures
* Safety and health requirements of tasks
* Workplace guidelines on providing feedback on OSH and security concerns
* OSH regulations
* Hazard control procedures
* OSH trainings relevant to work

**EVIDENCE GUIDE**

|  |  |
| --- | --- |
| 1. This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Arranged work area and items in accordance with 2. workplace procedures requirements 3. Followed work standards and procedures based on instructions 4. Applied ***Prevention and control measures*** based on instructions 5. Undertook orientations on ***OSH requirements and regulations*** in line with policy. 6. Provided feedback on occupational health and safety as per workplace instructions. 7. Adhered to workplace procedures for reporting hazards, incidents, injuries and sickness to as per workplace policy. 8. Identified and proposed ***OSH-related training needs*** as per workplace policy. |
| 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. |

# COMMON UNITS OF COMPETENCY

## UNDERSTAND GEOLOGY PRINCIPLES

**UNIT CODE:** MIN/OS/GEM/CC/01/4/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. Igneous, metamorphic and sedimentary rocks of Kenya are identified according to geological principles   3. Archean/ Greenstone belt rocks is identified based on geological principles   4. Proterozoic/ Mozambique Belt is identified based on geological principles   5. Sedimentary basin of Coast region, North Eastern region, Rift Valley and the Kavirondian Rift around L. Victoria is identified based on geological principles   6. Tertiary and quaternary volcanic in the Rift Valley 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

## CONDUCT MINE BLASTING

**UNIT CODE:** MIN/OS/GEM/CR/01/4/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to conduct mine blasting. It involves obtaining blast authorization/compliance, planning blasting activities, procuring mine explosives, storing mine explosives, designing mine blast, charging blast holes, securing blast area, detonating/blasting explosives and inspecting blasted mines

**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. Obtain blast authorization/compliance | * 1. Chief inspector/regional inspector of explosives is identified according to Explosives Act cap 115.   2. ***Blaster’s documents*** are verified according to Explosives Act cap 115   3. Blaster is registered according to explosives act cap 115   4. Blaster’s registration certificate is obtained according to explosives act. |
| 1. Plan blasting activities | * 1. Explosives needs are identified according to job specifications.   2. Amount of ***explosives*** required are calculated according to job requirement   3. Explosive area is identified according to explosive needs assessment   4. Explosive area is measured and marked according to job requirement   5. Explosive impacts beyond blasting site are identified and mitigated according to job requirement.   6. Controlled blasting is executed according to blast design and job description. |
| 1. Procurement mine explosives | * 1. Authorized explosive dealers are identified according to register at chief inspector of explosives office.   2. Explosive purchase permit is applied from inspector of explosives   3. Copy of purchase permit is presented to dealer according to explosive act.   4. Explosives are procured and transported according to explosives act |
| 1. Store mine explosives | * 1. Explosive magazine is constructed/obtained according to explosives act 115   2. Explosive ***magazine tools and equipment*** are identified, obtained and stored according to explosives act cap 115.   3. Explosives are recorded according to explosives act cap 115. |
| 1. Design mine blast | * 1. ***Explosive holes details*** are calculated according to job requirement   2. Blasting tools and equipment are obtained according to job specifications   3. Blast holes are charged according to job specifications   4. Drilling services are obtained according to job specifications |
| 1. Secure blast area | * 1. Public awareness is carried out according to explosive act   2. Blasting activity is reported to relevant authorities according to explosive act cap 115   3. People and animals are relocated from explosive site according to standard operating procedures   4. Explosive site is marked for blasting according to explosive act cap 115   5. ***Appropriate PPE*** are gowned according to OSH Act and mining regulations |
| 1. Detonate/blast explosives | * 1. Blaster set explosion site according to explosive act   2. Explosion site is secured according to explosive act cap 115   3. Explosives are detonated according to explosive Act cap 115 |
| 1. Inspect blasted mines | * 1. Blasted area is accessed according to explosive Act cap 115   2. Visual inspection is carried out to find if there are unexploded explosives.   3. Blasted mine is handed over to the owner according to standard operating 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. Blaster’s documents may include but not limited to: | * Training documents (Certificates) * Identification documents (ID, Passport) * Recommendations * Certificate of good conduct from CID |
| 1. Magazine tools and equipment may include but not limited to: | * Explosives * Detonators * Tapes * Fuel * Cables and terminals |
| 1. Explosives may include but not limited to: | * Ammonium Nitrate Explosives (Powder) * NH4NO3 (ANFO) * Emulsion Explosive |
| 1. Explosive holes details include but not limited to: | * Diameter * Depth * Distance from each hole * Number |
| 1. Appropriate PPE may include but not limited to: | * Respiratory * Blasting suit * Face and eye shields * Ear protectors * Helmets * Mining boots |

**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:

* Record keeping
* Blasting
* Communication
* Measurement
* Operation of Gemmological equipment
* Observing gemstones under natural light
* Interpreting colour charts and results
* Ability to differentiate properties of gemstones
* Colour differentiation
* Analytical skills
* Construction of explosive magazine

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types, explanation and identification of different stones
* Identifying various tools and equipment’s for gemstone identification
* Gemstone identification tools and equipment
* Understand international gem standards
* Characteristics and properties of gemstones
* Occupational safety and health standards
* Gem identification chart
* Explosives Act
* Chemistry

**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. Obtained blast authorization/compliance 2. Planned blasting activities 3. Procured mine explosives 4. Stored mine explosives 5. Designed mine blast 6. Charged blast hole 7. Secured blast area 8. Detonated/blasted explosives 9. Inspected blasted mines |
| 1. Resource Implications | The following resources should be provided:   * 1. Mine explosives   2. Explosive magazines   3. Personal Protective Equipment (PPEs)   4. Drilling equipment/services   5. Securing tapes   6. Calculator   7. Stationery |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Practical   2. Written test   3. Case Study/Situation   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. |

### CARRYOUT GEMSTONE IDENTIFICATION

**UNIT CODE:** MIN/OS/GEM/CR/02/4/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 and standard operating procedures   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 OSH Act 2007 and SOPs.   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 and SOPs.   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** |
| 1. Thermal inertia principles | * Degree of slowness with which the temperature of a body approaches that of its surrounding. |
| 1. Inclusions may include but not limited to: | * Cloud/Milky * Feather * Needle * Rutilated * Indented natural * Twinning wisps * Graining * Cavity * Pinpoints * Bearding |
| 1. Known gemstone may include but not limited to: | * Tsavorite * Rhodolite * Sapphire * Ruby * Aquamarine * Tanzanite * Emerald * Topaz * Opal * Tourmaline |
| 1. Illumination tools and equipment may include but not limited to: | * Beam/spot lights * Loupe * Gemological microscope |
| 1. Mineralogy may include but not limited to: | * Science of minerals that involves crystallographic properties, mineralogical properties and 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 and tools
* Observing gemstones under natural light
* Observing inclusions
* Interpreting colour charts and results
* Ability to differentiate properties of gemstones
* Ability to sketch the diagrams and draw conclusion.
* Colour differentiation
* Analytical skills
* Interpreting moh scale
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Setup 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. |
| 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: UNIT CODE:** MIN/OS/GEM/CR/03/4/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 standard operating procedure   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 converted to ***carats*** according to standard operating procedures.   4. Sample weight is taken according to user manuals   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 * Feathers |
| 1. Fire parameters may include but is not limited to: | * Properties of diamond colours under light on turning the gemstones |
| 1. Gemstone 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. Carats may include but is not limited to: | * 1 gram is equivalent 5 carats |
| 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 lens |
| 1. Physical characteristics of the gemstones 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 * Calculator |

**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
* Communication

**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. Chelsea filter   9. Gemstone (Pearl, Coral, Amber)   10. 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. Practical   5. Written exam |
| 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. |

## CARRY OUT GEMSTONE PROCESSING

**UNIT CODE:** MIN/OS/GEM/CR/04/4/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. 4. 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. Gemstones are faceted according to gem size, type and job specifications   6. 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 * Blue chart Gem Identification |
| 1. Gem faceting machine/Plate may include but is not limited to: | * Crystalite plates 1200, 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
* Communication

**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 set   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. Carborandum 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: UNIT CODE:** MIN/OS/GEM/CR/05/4/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 assessable statements 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   5. Design is ***implemented*** as per job 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
* Communication

**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
* Summarize 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.
* Basic crystallography
* Behavior of different gems under different environment and conditions
* Mining Act
* Law of contract

**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   12. Etching acid |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Portfolio Assessment   2. Practicals   3. Field trip   4. Interview   5. Case Study/Situation   6. 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. |