

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**GEMOLOGY TECHNICIAN**

**LEVEL 3**



**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

# 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 3. 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 3. 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**

# ABBREVAIATION 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/01/3/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control version

# TABLE OF CONTENTS

[FOREWORD ii](#_Toc70596150)

[PREFACE iii](#_Toc70596151)

[ACKNOWLEDGMENT iv](#_Toc70596152)

[ABBREVAIATION AND ACRONYMS v](#_Toc70596153)

[KEY TO UNIT CODE vi](#_Toc70596154)

[TABLE OF CONTENTS vii](#_Toc70596155)

[OVERVIEW viii](#_Toc70596156)

[BASIC UNITS OF COMPETENCY 1](#_Toc70596157)

[DEMONSTRATE COMMUNICATION SKILLS 2](#_Toc70596158)

[DEMONSTRATE NUMERACY SKILLS 6](#_Toc70596159)

[DEMONSTRATE DIGITAL LITERACY 11](#_Toc70596160)

[DEMONSTRATE ENTREPRENEURIAL SKILLS 15](#_Toc70596161)

[DEMONSTRATE EMPLOYABILITY SKILLS 20](#_Toc70596162)

[DEMONSTRATE ENVIRONMENTAL LITERACY 25](#_Toc70596163)

[DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES 29](#_Toc70596164)

[COMMON UNITS OF COMPETENCY 34](#_Toc70596165)

[UNDERSTAND GEOLOGY PRINCIPLES 35](#_Toc70596166)

[CORE UNITS OF COMPETENCY 40](#_Toc70596167)

[CARRYOUT GEMSTONE IDENTIFICATION 41](#_Toc70596168)

[CARRY OUT GEMSTONE PROCESSING 46](#_Toc70596169)

[CRAFT JEWELLERY PRODUCTS 51](#_Toc70596170)

# OVERVIEW

Gemmology Technician Certificate Level 3 qualification consists of competencies that an individual must achieve to enable him/her to work in the gemstone industry. It entails carrying out gemstone identification, carrying out gemstone processing and crafting jewellery products

The units of competency comprising Gemmology certificate level 3 qualifications include the following:

**BASIC COMPETENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/BC/01/3/A | Demonstrate communication skills |
| MIN/OS/GEM/BC/02/3/A | Demonstrate numeracy skills |
| MIN/OS/GEM/BC/03/3/A | Demonstrate digital literacy |
| MIN/OS/GEM/BC/04/3/A | Demonstrate entrepreneurial skills |
| MIN/OS/GEM/BC/05/3/A | Demonstrate employability skills |
| MIN/OS/GEM/BC/06/3/A | Demonstrate environmental literacy |
| MIN/OS/GEM/BC/07/3/A | Demonstrate occupational safety and health practices |
| **COMMON COMPENTENCIES** |
| MIN/OS/GEM/CC/01/3/A | Understand geology principles |

**CORE COMPENTENCIES**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/CR/01/3/A | Carryout gemstone identification |
| MIN/OS/GEM/CR/02/3/A | Carry out gemstone processing |
| MIN/OS/GEM/CR/03/3/A | Craft jewellery products |

# BASIC UNITS OF COMPETENCY

## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE: MIN/OS/GEM/BC/01/3/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate communication skills. It involves obtaining and conveying workplace information, speaking English at a basic operational level, participating in workplace meetings and discussions, and completing relevant work-related documents.

**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
7. Personal interaction is carried out clearly and concisely according to workplace requirements
 |
| 1. Speak English at a basic operational level
 | * 1. Participation in simple conversations with work colleagues is undertaken based on familiar topics
	2. Simple verbal instructions and requests are responded to according to workplace guidelines
	3. ***Routine procedures*** are provided in accordance with workplace policy
	4. Likes, dislikes and preferences are expressed based on individual preference
	5. Different forms of expression in English are identified in line with workplace requirements
 |
| 1. Participate in workplace meetings and discussions
 | * 1. Team meetings are attended on time according to schedules
	2. Own opinions are clearly expressed and those of others are listened to in accordance with workplace guidelines
	3. Meeting inputs are provided based on the meeting purpose and established ***protocols***
	4. ***Workplace interactions*** are conducted as per organizations’ code of conduct
	5. Work-related questions are asked and responded based on set protocols
	6. Meetings outcomes are interpreted and implemented as per organizations’ objectives
 |
| 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
 |

**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. Appropriate Sources may include but not limited to:
 | * Various department heads,
* organization documents
 |
| 1. Medium may include but not limited to:
 | * Method of communication
* Physical media
* Mechanical media
 |
| 1. Routine procedures may include but not limited to:
 | * Day to day activities
 |
| 1. Protocols may include but not limited to:
 | * Procedures for doing a task
 |
| 1. Workplace interactions may include but not limited to:
 | * Official inter relations
 |

**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
* Active Listening
* Communication
* writing
* Interpretation
* Basic Information Technology (IT)

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Minutes writing
* Report writing

**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. Prepared written communication following standard format of the organization
2. Accessed information using communication equipment
3. Spoken English at a basic operational level
4. Made use of relevant terms as an aid to transfer information effectively
5. Conveyed information effectively adopting the formal or informal communication
 |
| 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
3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Direct Observation
	2. Interview
	3. Written test
 |
| 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/02/3/A**

**UNIT DESCRIPTION:**

This unit covers the competencies required to demonstrate numeracy skills. It involves using whole numbers and money up to one hundred thousand for work, Locating, comparing and using highly familiar measurement for work, using highly familiar maps and diagrams for work, identifying and using some common 2D shapes for work and locating specific information in highly familiar tables, graphs and charts for work

**Elements and Performance Criteria**

| **Element** | **Performance Criteria** |
| --- | --- |
| Elements describe the essential outcomes. | Performance criteria describe the performance needed to demonstrate achievement of the element.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Use whole numbers for work
 | 1. Whole numbers and money amount up to 100,000 in highly familiar workplace documents and tasks are named and read according to workplace procedures.
2. Understanding of place value and the role of zero is demonstrate according to standard operating procedures.
3. Halves are recognised and understood in workplace as per Standard operating procedures.
4. Whole numbers and money amounting up to 100,000 are organised in size order and are compared as per workplace procedures.
5. Counting is done in numbers as per standard operating procedures.
6. Addition and subtraction of whole numbers and money up to 100,000 done in accordance with workplace requirement
7. Links between operations of addition and subtraction are clearly described as per job requirement.
8. Reasonableness of outcome with prompting and support is checked as per work requirement.
9. Numerical information is recorded, and the result of the task is communicated using informal language and symbolism as per workplace procedures.
 |
| 1. Locate, compare and use highly familiar measurement for work
 | 1. Measurements in highly familiar workplace documents and tasks are located as per standard operating procedures
2. Different units of measurements and their uses are identified in accordance with job specifications
3. The comparative relationship between the units of measurement identified as per standard operating procedures.
4. Understanding of conversion of amounts is demonstrated in accordance with requirements.
5. Informal language is used to compare measurements as per workplace procedures.
6. Digital time is well read and am and pm used in reference to time
7. Calendar used appropriately to record information in accordance with organizational events.
8. Basic measurement information is well read and recorded as per the manuals
9. Additions and subtraction of simple quantities done in workplace as per SOPs.
 |
| 1. Use highly familiar maps and diagrams for work
 | 1. Familiar items or places are in highly familiar maps and diagrams in accordance with SOPs
2. Simple symbols and pictorial representations are identified in accordance with familiar maps and diagrams
3. Simple oral directions are given to locate objects as per SOPs
4. Simple oral directions followed to locate objects as per job specifications
5. Understanding of informal directional language is demonstrated as per work procedures.
 |
| 1. Identify and use some common 2D shapes for work
 | 1. ***Common two-dimensional* shapes** are identified and named as per SOPs
2. Common objects are described in terms of size and shape as per SOPs
3. Common, every day, informal language is used to compare objects in accordance SOPs
4. Common objects are grouped based on shape, size, colour and features as per job requirements
 |
| 1. Locate specific Information in highly familiar tables, graphs and charts for work
 | 1. Features of simple tables identified as per work place procedures
2. Specific numerical information located in highly familiar tables using grid movement (up and down columns and across rows) and key as graph and chart manuals
3. Numerical information and data in highly familiar tables compared using appropriate informal language as per workplace procedures.
4. Information related to relevant workplace tasks as per workplace procedures
5. Features of simple graphs and charts identified as per SOPs
6. Specific numerical information located in highly familiar graphs and charts as per workplace procedures.
7. Numerical information and data compared using appropriate informal language as per SOPs.
 |

**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. Common two -dimensional shapes: may include but not limited to:
 | * + Round/circle
	+ Square
	+ Rectangular
	+ Triangle
 |

**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. Measured objects or materials as per job requirements
	2. Used calculator to perform the four fundamental operations
	3. Performed calculations involving money up to one hundred thousand
	4. Performed conversions between hours, minutes and seconds
	5. Calculated area and volume of regular shapes
	6. Created tables and graphs to represent and interpret information
 |
| 1. Resource Implications for competence assessment
 | 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
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
	4. Demonstration
 |
| 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/03/3/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 tasks and 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. ***Computer software*** are 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 in accordance with information 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 as per job requirement.
	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.

|  |  |
| --- | --- |
| **Variable**  | **Range** |
| 1. Computer software may include but not limited to:
 | * Operating system
* MS office
* Web browser

Media players  |
| 1. 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
 |
| 1. Word processing concepts may include but not limited to:
 | * Create
* Edit
* Print
* Documents
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical skills
* Interpretation
* Typing
* Communication
* Computing skills
* Basic ICT skills

**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 for competence assessment
 | 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
3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Written Test
	2. Observation
	3. Practical assignment
	4. Interview
	5. 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 ENTREPRENEURIAL SKILLS

**UNIT CODE : MIN/OS/GEM/BC/04/3/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate Entrepreneurial skills. It involves developing entrepreneurial culture, identifying entrepreneurial opportunities, starting, operating and growing a small 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. Develop entrepreneurial culture
 | 1. ***Entrepreneurship terminologies*** are defined following established procedures.
2. Contribution of entrepreneurship towards national development is identified in accordance to national development goals
3. Self-employment benefit are identified and emphasized to help create a positive attitude
4. Cultural factors that promote or inhibit entrepreneurial development areidentified and emphasis made on entrepreneurial promotion
5. Ways of managing factors that inhibit development of entrepreneurial culture are identified in accordance withcultural background and national social economic situation
 |
| 1. Identify entrepreneurial opportunities
 | 1. Myths associated with entrepreneurship, types of entrepreneurs and characteristics of entrepreneurship are determined in accordance with the set procedures
2. Identification of ***sources of business ideas,*** generation of business ideas is undertaken in accordance with the existing procedure
3. Evaluation of business opportunities is undertaken according to prevailing office procedures
4. Competencies are matched with business opportunities in accordance with business practices.
 |
| 1. Start a small business
 | Factors to consider when starting a small business are identified according to business sector. 1. ***Forms of business ownership*** are identified and procedure of starting a small business stipulated according to relevant legal requirements
2. Procedure of starting a small business is identified as per the legal requirements
3. Challenges faced when starting a small business are identified and mitigating factors provided for in accordance prevailing legal and regulatory requirement
4. Resource requirement for a small business are specified according to nature of business
5. Business life cycle is projected as per the nature of business and national social economic situation
 |
| 1. Operate a small business
 | 1. Relevant terms are defined in accordance with the set rules
2. Small business record is maintained in accordance with office procedures
3. Business support services are set up in accordance with the nature and size of business
4. Marketing activities are effected according to the nature and size of business
5. Small enterprise business plan is prepared depending on the size and nature of business and the client specification
6. Small business resources are run for efficiency and profitability
7. Small business records are kept for decision making purposes
8. Word processing concepts are applied in the management of small business according to office procedures
9. Basic computer application software and emerging trends and concerns are applied in small business management in accordance with office procedures
 |
| 1. Grow a small business
 | 1. Methods of growing/expanding a small business are identified and implemented in accordance with growth schedule
2. Resources for growing small business are identified and implementing
3. Small business growth plans are prepared according to growth schedule
4. ICT and small business growth schedule is prepared in accordance with office procedures
5. Use of computers and technology is incorporated in small scale business growth schedule in accordance with technological trends
6. Social media is used for business growth and profitability
7. Emerging issues and trends are considered in accordance with business growth schedule and activities
8. Community interest is built in product/service according to growth plan
9. Business communication is enhanced according to business communication planand profitability
10. Basic business growth strategies are identified and implemented for increased profitability
11. Word processing concepts are applied in growing of small business according to office procedures
12. Basic computer application software, programming and emerging trends and concerns are applied in small business growth in accordance with office procedures for growth and profitability
 |

**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. Entrepreneurship terminologies include but not limited to:
 | * Intrapreneurship
* Enterprise
* Business vision. Mission, core values, objectives
 |
| 1. Sources of business ideas may include but not limited to:
 |

|  |
| --- |
| * Brainstorming
* Personal hobbies
* Newspapers, magazines,
* Friends and relatives
* Accounting/Administrative work
* Modern trends and concerns
 |

 |
| 1. Forms of business ownership may include but not limited to:
 | * Sole proprietorship
* Partnership
* Limited Company
* Unlimited Company
 |

**REQUIRED SKILLS AND KNOWLEDGE**

**Required Skills**

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

The individual needs to demonstrate the following skills:

* Marketing skills
* Advertising
* Basic book-keeping
* accounting skills
* Communication skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Public relations concepts
* Basic product promotion strategies
* Basic market and feasibility studies
* Basic 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

**EVIDENCE GUIDE**

This section describes the required skills which supports performance. These skills will need to be considered in the learning and assessment process.

|  |  |  |
| --- | --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:

|  |
| --- |
| 1. Demonstrated basic entrepreneurial skills
2. Demonstrated ability to conceptualize and plan a micro/small enterprise
3. Demonstrated ability to manage/operate a micro/small-scale business
4. Demonstrated basic marketing skills
 |

 |
| 1. Resource Implications for assessment
 | 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
3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:

|  |  |
| --- | --- |
| 3.1 Written tests3.2 Oral Questioning 3.3 Observation3.4 Third Party Report |  |

 |
| 1. Context of Assessment
 |

|  |
| --- |
| Competency may be assessed:4.1 On the job4.2 Off the job4.3 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/05/3/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 objectives
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. Drug and substance abuse may include but not limited to:
 | Commonly abused* Alcohol
* Tobacco
* Miraa
* Over-the-counter drugs
* Cocaine
* Bhang
* Glue
 |
| 1. Feedback may include but not limited to:
 | * Verbal
* Written
* Informal
* Formal
 |
| 1. Team may include but not limited to:
 | * Small work group
* Staff in a section/department
* Inter-agency group
 |
| 1. Innovation may include but not limited to:
 | * New ideas
* Original ideas
* Different ideas
* Methods/procedures
* Processes
* New tools
 |
| 1. Emerging issues may include but not limited to:
 | * Terrorism
* Social media
* National cohesion
* Open offices
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Critical thinking
* Observation
* Organizing
* 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
* Organizing work
* 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
* Innovation
* 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/06/3/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate environmental literacy. It involves controlling environmental hazard, controlling environmental pollution and demonstrating sustainable resource use.

**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 and handling methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS.
2. Disposal methods of hazardous wastes are followed at all times according to environmental regulations and OSHS.
3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental Pollution
 | * 1. ***Environmental pollution******control measures*** are complied with 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
 | * 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.
 |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. PPE may include but not limited to:
 | * + Mask
	+ Gloves
	+ Goggles
	+ Safety hat
	+ Overall
	+ Hearing protector
 |
| 1. Environmental pollution control measures may include but not limited to:
 | * + Methods for minimizing or stopping spread and ingestion of airborne particles
	+ Methods for minimizing or stopping spread and ingestion of gases and fumes
	+ Methods for minimizing or stopping spread and ingestion of liquid wastes
 |
| 1. Waste management procedures may include but not limited to:
 | * + Sorting
	+ Storing of items
	+ Recycling of items
	+ Disposal of items
 |
| 1. Resources may include but not limited to:
 | * + Electric
	+ Water
	+ Fuel
	+ Telecommunications
	+ Supplies
	+ Materials
 |
| 1. Workplace environmental hazards may include but not limited to:
 | * + Biological hazards
	+ Chemical and dust hazards
	+ Physical hazards
 |

**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
* Observation
* Writing
* Analytical

**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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1.1 Controlled environmental hazard 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use |
| 1. Resource Implications for assessment
 | The following resources should be provided:* 1. Workplace with storage facilities
	2. Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.)
	3. PPE
	4. Manuals and references
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:3.1 Observation3.2 Oral questioning3.3 Written examination |
| 1. Context of Assessment
 | Competency may be assessed 1. On the job
2. Off the job
3. During industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE: MIN/OS/GEM/BC/07/3/A**

**UNIT DESCRIPTION**

This unit specifies the competencies required to practice and promote safety and health at work. This entails preparing to practice safety and health at work and complying and promoting compliance of workers to organization’s occupational safety and health instructions and requirements

**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. Prepare to practice safety and health at work
 | 1.1 Awareness of legislation that outlines the minimum standards for occupational safety and health requirements/ regulations are emphasized1.2 Benefits of implementing an occupational safety and health program are identified1.3 ***Safety requirements/ regulations*** of own work and of other workers are familiarized1.4 Workplace standards and procedures ***for incidents and Emergencies*** are determined1.5 ***Prevention and control measures***, including use of ***safety gears/PPE*** (Personal Protective Equipment) to avoid accident, injuries and sickness are identified |
| 1. Comply and promote compliance of workers to organization’s occupational safety and health instructions and requirements
 | 2.1 Safety instructions and safety signs are followed and disseminated to co-workers2.2 Safe handling of tools, equipment and materials is learned and shared with co-workers2.3 Execution of own work and of co-workers is monitored in according to safe work procedures 2.4 Use of safe guards and safety devices is monitored2.5 Hazards, incidents, injuries and sickness in the workplace are reported properly following standards and 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. Safety requirements / regulations may include but are not limited to:
 | * Building code
* Permit to Operate
* Occupational Safety and Health Standards
 |
| 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. 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 devices/ PPEs (personal protective equipment) 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
 |

**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
* Observation
* Reporting
* Organizing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Elements of an effective occupational safety and health program
* Benefits of implementing an occupational safety and health program
* Safety requirements of own work and of other workers
* Standard emergency plan and procedures in the workplace
* Different OSH control measures
* General OSH principles
* Work standards and procedures
* Safe handling procedures of tools, equipment’s and materials
* Standard emergency plan and procedures in the workplace
* Different OSH control measures
* Standard accident and illness reporting procedures in the workplace
* Monitoring system on compliance to work safety and health

**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. Arranged work area and items in accordance with workplace procedures requirements
2. Followed work standards and procedures based on instructions
3. Applied ***Prevention and control measures*** based on instructions
4. Undertook orientations on ***OSH requirements and regulations*** in line with policy.
5. Provided feedback on occupational health and safety as per workplace instructions.
6. Adhered to workplace procedures for reporting hazards, incidents, injuries and sickness to as per workplace policy.
7. Identified and proposed ***OSH-related training needs*** as per workplace policy.
 |
| 1. Resource Implications for assessment
 | 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/01/3/A**

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Understood rocks and minerals appropriately
2. Understood mineral crystal systems appropriately
3. Understood geology of Kenya appropriately
4. Understood ore deposits appropriately
5. Understood weathering of rocks and minerals appropriately
 |
| 1. Resource Implications
 | The following resources should be provided:2.1 Workplace or assessment location2.2 OSH personal records2.3 PPE2.4 Health records |
| 1. Methods of Assessment
 | Competency may be assessed through:3.1 Portfolio Assessment3.2 Interview3.3 Case Study/Situation3.4 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. |

# CORE UNITS OF COMPETENCY

## CARRYOUT GEMSTONE IDENTIFICATION

**UNIT CODE:** **MIN/OS/GEM/CR/01/3/A**

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 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
* Tourmalines
 |
| 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 of an area, rock properties
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Identified natural gemstones correctly
2. Identified treated gemstones correctly
3. Identified imitation/ assembled gemstones correctly
4. Identified synthetic gemstones correctly
5. Identified gemstone colour correctly
6. Performed thermal test correctly
7. Tested refractive index of a stone correctly
8. Tested the hardness of a stone correctly
9. Tested the specific gravity correctly
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Gemological microscope
	2. Refractometer
	3. Moh’s hardness scale
	4. Loupe
	5. Tweezers
	6. Gem identification chart
	7. samples
	8. Beam light
	9. Hydrostatic balance
 |
| 1. Methods of Assessment
 | Competency may be assessed through:3.1 Practical3.2 Written test3.3 Case Study/Situation3.4 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. |

## CARRY OUT GEMSTONE PROCESSING

**UNIT CODE:** **MIN/OS/GEM/CR/02/3/A**

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

3.8Gemstone 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

4.5 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 according to the job requirement.
	5. Gem ***treatment*** is done according to its properties and job specification
 |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Identified gemmological stone correctly
2. Carried out gemstone identification tests correctly
3. Performed gemstone cutting correctly
4. Operated the gem faceting machine correctly
5. Observed personal safety when cutting appropriately
6. Conducted gemstone pre-shaping correctly
7. Performed gemstone faceting correctly
8. Performed gemstone polishing correctly
9. Performed gemstone treatment correctly
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Gemstone sample
	2. Gem velvet cloth
	3. Microscope
	4. Refractometer
	5. Dichroscope
	6. Polariscope
	7. Tweezers or a gem holder
	8. Callipers or a micrometre
	9. Moh’s Scale
	10. Light source
	11. Hydrostatic balance beam scale
	12. Heavy liquids
	13. Loupe(10x)
	14. Crystal models
	15. Refractive index fluid
	16. Samples of rough & cut gemstone
	17. Gem faceting machine
	18. Gem polishing plates
	19. Caborandum and grit
	20. Treatment chemicals and heat source
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Practical Assessment
	2. Written
	3. Case Study/Situation
	4. Observation/Demonstration and oral questioning
	5. During industrial attachment
 |
| 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.  |
| 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/03/3/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**These describe the key outcomes that make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| --- | --- |
| 1. Identify required materials
 | * 1. Specific ***jewellery materials*** are obtained according to organisational and standard operating procedures.
	2. Tools and equipment are identified and prepared for use based on job requirements.
	3. The jewellery design is obtained according to organisational procedures.
 |
| 1. Craft jewellery products
 | * 1. The jewellery design is examined for details according to design provided.
	2. Personal safety is observed according to OSHA 2007.
	3. ***Crafting tools and equipment*** are identified and gathered based on standard operating procedures.
	4. Materials are cut, moulded or soldered as per the design requirements

The design is ***implemented*** as per specifications. |
| 1. Conduct jewellery finishing
 | * 1. Jewellery ***finishing*** is done based on designs and workplace policy.
	2. Mounting tools and consumables are identified and gathered based on standard operating procedures
	3. Gemstone is mounted on the jewellery according to design requirements
 |
| 1. Package jewellery products
 | * 1. Packaging materials are identified and gathered according to standard operating procedures.
	2. Care and handling of jewellery is observed based on organizational procedures
	3. Jewellery is packaged based on design and size of product and how delicate the gemstone is.
	4. Storage and security of jewellery products is observed according organizational procedures
 |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range**  |
| 1. Jewellery materials may include but is not limited to:
 | * Gemstones
* Precious Metals
* Non-precious metal
* Alloys
 |
| 1. Crafting tools and equipment may include but is not limited to:
 | * Cutting tools
* Pliers
* Smelters
* Files
* Fasteners
* Polishing tools
* Bending tools
 |
| 1. Implementing procedures may include but is not limited to:
 | * Cutting
* Soldering
* Molding
 |
| 1. Finishing may include but is not limited to:
 | * Coating
* Polishing
* Spraying
* Electroplating
 |
| 1. Jewellery polishing tools may include but is not limited to:
 | * Rubber abrasive wheels
* Sanding disks and wheels
* Magnetic polishers and tumblers
* Jewellery polishing compounds
* Jewellery buffs
* Grinding and Satin finish wheels
* Cratex polishing wheels
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Understanding jewelry design theory and artistry
* Illustrating shape, form, and texture of metal
* Rendering faceted gems, pearls, colored metals, etc.
* Learning traditional drafting techniques
* Developing motifs to create sketches of jewelry objects
* Creating 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.
* Outlining intellectual property considerations when producing jewellery work
* Exploring techniques to achieve different effects in jewellery
* Summarizing the main aspects of historical and contemporary jewellery-making practice and how they can inform own design ideas
* Describing for the elements and principles of design, the key characteristics, key interrelationships and use in jewellery
* Summarizing, for a range of tools and equipment used to produce jewellery, key physical features and uses, cleaning and maintenance techniques and storage requirements
* Describing the physical properties and capabilities of a range of materials and techniques used to produce jewellery
* Discussing typical work space requirements for producing jewellery including ways of organizing space and equipment for efficient work operation
* Describing procedures for working safely with jewellery materials, tools and equipment.

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Identified and selected appropriate tools and equipment for crafting appropriately
2. Examined jewellery design appropriately
3. Observed personal safety appropriately
4. Cut, mouldered and soldered appropriately
5. Implemented and finished jewellery design correctly
6. Polished jewellery using appropriate tools correctly
7. Packaged the jewellery with appropriate packaging materials appropriately
8. Cared and handled jewellery correctly.
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Cutting tools
	2. Pliers
	3. Smelters
	4. Files
	5. Fasteners
	6. Polishing tools
	7. Bending tools
	8. Gemstones
	9. Precious Metals
	10. Non-precious metal
	11. Alloys
 |
| 1. Methods of Assessment
 | Competency may be assessed through:3.1 Portfolio Assessment3.2 Interview3.3 Case Study/Situation3.4 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. |