

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**GEMOLOGY TECHNICIAN**

**LEVEL 6**



**TVET CDACC**

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

**NAIROBI**

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement Kenya’s development blue print and sustainable development goals.

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

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for developing a competency based curriculum for Gemmology level 6. These Occupational Standards will also be the bases for assessment of an individual for competence certification.

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

**PRINCIPAL SECRETARY,**

**VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

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

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

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), Gemmology Sector Skills Advisory Committee (SSAC) and Ruiru Gikonyo Memorial Institute for Technical Skills have developed these Occupational Standards for a Gemmologist. These National occupational standards will be the bases for development of competency-based curriculum for Gemmology Level 6. These Standards will also be the bases for assessment of an individual for competence certification.

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

I am grateful to the Council Members, Council Secretariat, Gemmology SSAC, expert workers and all those who participated in the development of these occupational standards.

**CHAIRPERSON,**

**TVET CDACC**

# ACKNOWLEDGMENT

These Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am sincerely thankful to Ruiru Gikonyo Institute for Technical Skills for providing the finance and mobilising the industry players who played a key role in the development of these Standards.

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

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

**CHAIRPERSON**

**GEMOLOGY SECTOR SKILLS ADVISORY COMMITTEE**

# ABBREVIATION AND ACRONYMS

2D Two Dimensional

AIDS Acquired Immune Deficiency Syndrome

BC Basic Competency

CC Common Competency

CDACC Curriculum Development, Assessment and Certification Council

CR Core Competency

CU Curriculum

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

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/01/6/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control version

#

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# OVERVIEW

Gemmology Technician Level 6 consists of 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, designing jewellery products and performing gemstone marketing activities and carrying out gemmological stone’s quality assurance

The units of competency comprising Gemmology Technician level 6 include the following:

**BASIC UNITS OF COMPETENCY**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/BC/01/6/A | Demonstrate communication skills |
| MIN/OS/GEM/BC/02/6/A | Demonstrate numeracy skills |
| MIN/OS/GEM/BC/03/6/A | Demonstrate digital literacy |
| MIN/OS/GEM/BC/04/6/A | Demonstrate entrepreneurial skills |
| MIN/OS/GEM/BC/05/6/A | Demonstrate employability skills |
| MIN/OS/GEM/BC/06/6/A | Demonstrate environmental literacy |
| MIN/OS/GEM/BC/07/6/A | Demonstrate occupational safety and health practices |

**COMMON UNITS OF COMPENTENCIES**

|  |  |
| --- | --- |
| MIN/OS/GEM/CC/01/6/A | Understand geology principles |
| MIN/OS/GEM/CC/02/6/A | Understand mining technology |

**CORE UNITS OF COMPENTENCY**

|  |  |
| --- | --- |
| **Unit of Competency Code** | **Unit of Competency Title** |
| MIN/OS/GEM/CR/01/6/A | Carry out gemstone identification |
| MIN/OS/GEM/CR/02/6/A | Perform gemstone grading |
| MIN/OS/GEM/CR/03/6/A | Carry out gemstone processing |
| MIN/OS/GEM/CR/04/6/A | Design jewellery products |
| MIN/OS/GEM/CR/05/6/A | Perform gemstone marketing activities |
| MIN/OS/GEM/CR/06/6/A | Carryout gemmological stones quality assurance |

# BASIC UNITS OF COMPETENCY

### DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/01/6/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, developing communication strategies, establishing and maintaining communication pathways, conducting interviews, facilitating group discussion and representing the organization.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Meet communication needs of clients and colleagues
 | 1. Specific communication needs of clients and colleagues are identified and met based on workplace requirements
2. Different communication approaches are identified and applied according to clients’ needs
3. Conflict is identified and addressed as per the standards of the organization
 |
| 1. Develop communication strategies
 | * 1. Strategies for effective internal and external dissemination of information are developed as per organization’s requirements
	2. Special communication needs are considered in developing strategies according workplace procedures
	3. ***Communication strategies*** are analyzed, evaluated and revised based the workplace needs
 |
| 1. Establish and maintain communication pathways
 | * 1. Pathways of communication are established as per organization policy
	2. Pathways are maintained and reviewed according to organization procedures
 |
| 1. Promote use of communication strategies
 | * 1. Information is provided to all areas of the organization as per strategy requirements
	2. Effective communication techniques are articulated and modeled according work requirements
	3. Personnel are given guidance about adapting communication strategies as per organization procedures
 |
| 1. Conduct interview
 | 1. A range of appropriate communication strategies are employed in ***interview situations*** based on the workplace requirements
2. Records of interviews are made and maintained in accordance with organizational procedures
3. Effective questioning, listening and nonverbal communication techniques are used as per needs
 |
| 1. Facilitate group discussion
 | 1. Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements
2. Strategies to encourage group participation are identified and used as per organizations’ procedures
3. Meetings objectives and agenda are set and followed based on workplace requirements
4. Relevant information is provided and feedback obtained according to set protocols
5. Evaluation of group communication strategies is undertaken in accordance with workplace guidelines
6. Specific communication needs of individuals are identified and addressed as per individual needs
 |
| 1. Represent the organization
 | 1. 7Relevant presentation are researched and presented based on internal or external communication forums requirements
2. Presentation is delivered in a clear and sequential manner as per the predetermined time
3. Presentation is made as per appropriate media
4. Difference views are respected based on workplace procedures
5. Written communication is done as per organizational standards
6. Inquiries are responded according to organizational standard
 |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Communication
* Active listening
* Interpretation
* Negotiation
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Communication process
* Dynamics of groups
* Styles of group leadership
* Key elements of communications strategy

**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. Developed communication strategies to meet the organization requirements and applied in the workplace
2. Established and maintained communication pathways for effective communication in the workplace
3. Used communication strategies involving exchanges of complex oral information
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Access to relevant workplace or appropriately simulated environment where assessment can take place
2. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Direct observation
2. Oral questioning
3. Written texts
 |
| 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/02/6/A

**UNIT DESCRIPTION**

This unit describes the competencies required to demonstrate numeracy skills. It involves; applying a wide range of mathematical calculations for work; applying ratios, rates and proportions to solve problems; estimating, measuring and calculating measurement for work; using detailed maps to plan travel routes for work; using geometry to draw and construct 2D and 3D shapes for work; collecting, organizing and interpreting statistical data; using routine formula and algebraic expressions for work and using common functions of a scientific calculator.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range.*** |
| 1. Apply a wide range of mathematical calculations for work
 | * 1. Mathematical information embedded in a range of workplace tasks and texts is extracted as per workplace procedures.
	2. Mathematical information is interpreted and comprehended as per job specifications
	3. A range of mathematical and problem solving processes are selected and used as per job specification
	4. Different forms of fractions, decimals and percentages are flexibly used as per SOPs
	5. Calculation performed with positive and negative numbers as per SOPs
	6. Numbers are expressed as powers and roots and are used in calculations as per SOPs
	7. Calculations done using routine formulas as per SOPs
	8. Estimation and assessment processes are used to check outcome as per workplace procedures
	9. Mathematical language is used to discuss and explain the processes, results and implications of the task as per workplace procedures
 |
| 1. Use and apply ratios, rates and proportions for work
 | * 1. Information regarding ratios, rates and proportions extracted from a range of workplace tasks and texts as per SOPs
	2. Mathematical information related to ratios, rate and proportions is analysed as per SOPs
	3. Problem solving processes are used to undertake the task as per workplace procedures
	4. Equivalent ratios and rates are simplified as per SOPs
	5. Quantities are calculated using ratios, rates and proportions as per SOPS
	6. Graphs, charts or tables are constructed to represent ratios, rates and proportions as per SOPs
	7. The outcomes reviewed and checked as per job specifications
	8. Information is record using mathematical language and symbols as per workplace procedures
 |
| 1. Estimate, measure and calculate measurement for work
 | * 1. Measurement information embedded in workplace texts and tasks are extracted and interpreted as per job specifications
	2. Appropriate workplace measuring equipment are identified and selected as per job specifications
	3. Accurate measurements are estimated and made as per SOPs
	4. The area of ***2D shapes*** including compound shapes are calculated as per SOPs
	5. The volume of 3D shapes is calculated using relevant formulas as per SOPs
	6. Sides of right angled triangles are calculated using Pythagoras’ theorem as per SOPs
	7. conversions are perform between units of measurement as per job specification
	8. Problem solving processes are used to undertake the task as per workplace Procedures
	9. The measurement outcomes are reviewed and checked as per workplace procedures
	10. Information is recorded using mathematical language and symbols appropriate for the task as per workplace procedures
 |
| 1. Use detailed maps to plan travel routes for work
 | * 1. Different types of maps are identified and interpreted as per job requirements
	2. Key features of maps are identified as per job requirements
	3. Scales are identified and interpreted as per job requirements
	4. Scales are applied to calculate actual distances
	5. Positions or locations are determined using directional information as per job requirements
	6. Routes are planned by determining directions and calculating distances, speeds and times as per job requirements
	7. Information is gathered and identified and relevant factors related to planning a route checked as per job requirements
	8. Relevant equipment is select and checked for accuracy and operational effectiveness as per job requirements
	9. Task is planned and recorded using specialized mathematical language and symbols appropriate for the task as per job requirements
 |
| 1. Use geometry to draw 2D shapes and construct 3D shapes for work
 | * 1. A range of 2D shapes and 3D shapes and their uses in work contexts is identified as per job specifications
	2. Features of 2D and 3D shapes are named and described as per job specifications
	3. Types of angles in 2D and 3D shapes are identified as per job specifications
	4. Angles are drawn, estimated and measured using geometric instruments as per job requirements
	5. Angle properties of 2D shapes are named and identified as per SOPs
	6. Angle properties are used to evaluate unknown angles in shapes as per SOPs
	7. Properties of perpendicular and parallel lines are applied to shapes as per SOPs
	8. Understanding and use of symmetry is demonstrated as per SOPs
	9. Understanding and use of similarity is demonstrated as per SOPs
	10. The workplace tasks and mathematical processes required are identified as per workplace procedures
	11. 2D shapes is drawn for work as per job specification
	12. 3D shapes is constructed for work as per job specification
	13. The outcomes are reviewed and checked as per workplace procedures
	14. Specialized mathematical language and symbols appropriate for the task are used as per SOPs
 |
| 1. Collect, organize, and interpret statistical data for work
 | * 1. Workplace issue requiring investigation are identified as per workplace procedures
	2. Audience / population / sample unit is determined as per workplace procedures as per workplace procedures
	3. Data to be collected is identified as per workplace procedures
	4. Data collection method is selected as per workplace procedures
	5. Appropriate statistical data is collected and organized as per SOPs
	6. Data is illustrated in appropriate formats as per SOPs
	7. The effectiveness of different types of graphs are compared as per SOPs
	8. The summary statistics for collected data is calculated as per SOPs
	9. The results / findings are interpreted as per SOPs
	10. Data is checked to ensure that it meets the expected results and content as per workplace procedures
	11. Information from the results including tables, graphs and summary statistics is extracted and interpreted as per workplace procedure
	12. Mathematical language and symbols are used to report results of investigation as per workplace procedure
 |
| 1. Use routine formula and algebraic expressions for work
 | * 1. Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated as per SOPs
	2. Simple algebraic expressions and equations are developed as per job specification
	3. Operate on algebraic expressions as per job requirement
	4. Algebraic expressions are simplified as per job requirement
	5. Substitution into simple routine equations is done as per SOPs
	6. Routine formulas used for work tasks are identified and comprehended as per SOPs
	7. Routine formulas are evaluate by substitution as per SOPs
	8. Routine formulas transposed as per SOPs
	9. Appropriate formulas are identified and used for work related tasks as per workplace procedures
	10. Outcomes are checked and result of calculation used as per workplace procedures
 |
| 1. Use common functions of a scientific calculator for work
 | * 1. Required numerical information to perform tasks is located as per job specification
	2. The order of operations and function keys necessary to solve mathematical calculation are determined as per job specification
	3. Function keys on a scientific calculator are identified and used as per SOPs
	4. Estimations are referred to check reasonableness of problem solving process as per workplace procedures
	5. Appropriate mathematical language, symbols and conventions are used to report results as per workplace procedures
 |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. 2D shapes may include but not limited may include but not limited to:
 | * Triangles
* Square
* Rectangle
* 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. Developed communication strategies to meet the organization requirements and applied in the workplace
2. Established and maintained communication pathways for effective communication in the workplace
3. Used communication strategies involving exchanges of complex oral information
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace or appropriately simulated environment where assessment can take place
2. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

### DEMONSTRATE DIGITAL LITERACY

**UNIT CODE:** MIN/OS/GEM/BC/03/6/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Identify appropriate computer software and hardware
 | * 1. Concepts of ICT are determined in accordance with computer equipment
	2. Classifications of computers are determined in accordance with manufacturers specification
	3. Appropriate computer software is identified according to manufacturer’s specification
	4. Appropriate computer hardware is identified according to manufacturer’s specification
	5. Functions and commands of operating system are determined in accordance with manufacturer’s specification
 |
| 1. Apply security measures to data, hardware, software in automated environment
 | * 1. ***Data security and privacy are classified*** in accordance with the prevailing technology
	2. ***Security threats*** reidentified ***and control measures*** are applied in accordance with laws governing protection of ICT
	3. Computer threats and crimes are detected in accordance to Information Management security guidelines
	4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
 |
| 1. Apply computer software in solving tasks
 | * 1. ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation as per the job requirements
	2. ***Word processing utilities*** are applied in accordance with workplace procedures
	3. Worksheet layout is prepared in accordance with work procedures
	4. Worksheet is built and data manipulated in the worksheet in accordance with workplace procedures
	5. Continuous data manipulated on worksheet is undertaken in accordance with work requirements
	6. Database design and manipulation is undertaken in accordance with office procedures
	7. Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
 |
| 1. Apply internet and email in communication at workplace
 | * 1. Electronic mail addresses are opened and applied in workplace communication in accordance with office policy
	2. Office internet functions are defined and executed in accordance with office procedures
	3. ***Network configuration*** is determined in accordance with office operations procedures
	4. Official World Wide Web is installed and managed according to workplace procedures
 |
| 1. Apply Desktop publishing in official assignments
 | * 1. Desktop publishing functions and tools are identified in accordance with manufactures specifications
	2. Desktop publishing tools are developed in accordance with work requirements
	3. Desktop publishing tools are applied in accordance with workplace requirements
	4. Typeset work is enhanced in accordance with workplace standards
 |
| 1. Prepare presentation packages
 | * 1. Types of presentation packages are identified in accordance with office requirements
	2. Slides are created and formulated in accordance with workplace procedures
	3. Slides are edited and run-in accordance with work procedures
	4. Slides and handouts are printed according to work requirements
 |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Appropriate computer hardware may include but not limited to:
 | Collection of physical parts of a computer system such as:* Computer case, monitor, keyboard, and mouse
* All the parts inside the computer case, such as the hard disk drive, motherboard and video card
 |
| 1. Data security and privacy may include but not limited to:
 | * Confidentiality of data
* Cloud computing
* Integrity -but-curious data surfing
 |
| 1. Security and control measures may include but not limited to:
 | * Counter measures against cyber terrorism
* Risk reduction
* Cyber threat issues
* Risk management
* Pass-wording
 |
| 1. Security threats may include but not limited to:
 | * Cyber terrorism
* Hacking
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Analytical skills
* Interpretation
* Typing
* Communication
* Computing (applying fundamental operations such as addition, subtraction, division and multiplication)
* Using calculator
* Basic ICT skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Software concept
* Functions of computer software and hardware
* Data security and privacy
* Computer security threats and control measures
* Technology underlying cyber-attacks and networks
* Cyber terrorism
* Computer crimes
* Detection and protection of computer crimes
* Laws governing protection of ICT
* Word processing;
* Functions and concepts of word processing.
* Documents and tables creation and manipulations
* Mail merging
* Word processing utilities
* Spread sheets;
* Meaning, formulae, function and charts, uses and layout
* Data formulation, manipulation and application to cells
* Database;
* Database design, data manipulation, sorting, indexing, storage retrieval and security
* Desktop publishing;
* Designing and developing desktop publishing tools
* Manipulation of desktop publishing tools
* Enhancement of typeset work and printing documents
* Presentation Packages;
* Types of presentation Packages
* Creating, formulating, running, editing, printing and presenting slides and handouts
* Networking and Internet;
* Computer networking and internet.
* Electronic mail and world wide web
* Emerging trends and issues in ICT;
* Identify and integrate 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 and controlled security threats
	2. Detected and protected computer crimes
	3. Applied word processing in office tasks
	4. Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures
	5. Opened electronic mail for office communication as per workplace procedure
	6. Installed internet and World Wide Web for office tasks in accordance with office procedures
	7. Integrated emerging issues in computer ICT applications
	8. Applied laws governing protection of ICT
 |
| 1. Resource Implications
 |  The following resources should be provided:* 1. Access to relevant workplace where assessment can take place
	2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written test
	4. Portfolio of Evidence
	5. Interview
	6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

### DEMONSTRATE ENTREPRENEURIAL SKILLS

**UNIT CODE :** MIN/OS/GEM/BC/04/6/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

### DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** MIN/OS/GEM/BC/05/6/A

**UNIT DESCRIPTON**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Conduct self-management
 | 1. Personal vision, mission and goals are formulated based on potential and in relation to organization objectives
2. Emotional intelligence is demonstrated as per workplace requirements.
3. Individual performance is evaluated and monitored according to the agreed targets.
4. Assertiveness is developed and maintained based on the requirements of the job.
5. Accountability and responsibility for own actions are demonstrated based on workplace instructions.
6. Self-esteem and a positive self-image are developed and maintained based on values.
7. Time management, attendance and punctuality are observed as per the organization policy.
8. Goals are managed as per the organization’s objective
9. Self-strengths and weaknesses are identified based on personal objectives
 |
| 1. Demonstrate interpersonal communication
 | 1. Writing skills are demonstrated as per communication policy
2. Negotiation and persuasion skills are demonstrated as per communication policy
3. Internal and external stakeholders’ needs are identified and interpreted as per the communication policy
4. Communication networks are established based on workplace policy
5. Information is shared as per communication policy
 |
| 1. Demonstrate critical safe work habits
 | * 1. Stress is managed in accordance with workplace policy.
	2. Punctuality and time consciousness is demonstrated in line with workplace policy.
	3. Personal objectives are integrated with organization goals based on organization’s strategic plan.
	4. ***Resources*** are utilized in accordance with workplace policy.
	5. Work priorities are set in accordance to workplace goals and objectives.
	6. Leisure time is recognized and utilized in line with personal objectives.
	7. ***Drugs and substances of abuse*** are identified and avoided based on workplace policy.
	8. HIV and AIDS prevention awareness is demonstrated in line with workplace policy.
	9. Safety consciousness is demonstrated in the workplace based on organization safety policy.
	10. ***Emerging issues*** are identified and dealt with in accordance with organization policy.
 |
| 1. Lead a workplace team
 | 1. Performance targets for the ***team*** are set based on organization’s objectives
2. Duties are assigned in accordance with the organization policy.
3. ***Forms of communication*** in a team are established according to organization’s policy.
4. Team performance is evaluated based on set targets as per workplace policy.
5. Conflicts are resolved between team members in line with organization policy.
6. Gender related issues are identified and mainstreamed in accordance workplace policy.
7. Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010.
8. Healthy relationships are developed and maintained in line with workplace.
 |
| 1. Plan and organize work
 | 1. Work plans are prepared based on activities and budget.
2. Assigned tasks are interpreted and expectations identified as per the workplace instructions.
3. Task occupational safety and health requirements are identified and observed regulations.
4. Work resources are identified, mobilized, allocated and utilized based on organization work plans.
5. Work activities are monitored and evaluated in line with work plans and workplace policy.
6. Work plans are reviewed based on target and available resources.
 |
| 1. Maintain professional growth and development
 | * 1. Personal training needs are identified and assessed in line with the requirements of the job.
	2. ***Training and career opportunities*** are identified and utilized based on job requirements.
	3. Resources for training are mobilized and allocated based organizations and individual skills needs.
	4. Licensees and certifications relevant to job and career are obtained and renewed as per policy.
	5. Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives.
	6. Recognitions are sought as proof of career advancement in line with professional requirements.
 |
| 1. Demonstrate workplace learning
 | * 1. Learning opportunities are sought and managed based on job requirement and organization policy.
	2. Improvement in performance is demonstrated based on courses attended.
	3. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job
	4. Time and effort is invested in learning new skills based on job requirements
	5. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.
	6. New systems are developed and maintained in accordance with the requirements of the job.
	7. Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job.
 |
| 1. Demonstrate problem solving skills
 | * 1. Creative, innovative and practical solutions are developed based on the problem
	2. Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job.
	3. Team problems are solved as per the workplace guidelines
	4. Problem solving strategies are applied as per the workplace guidelines
	5. Problems are analyzed and assumptions tested as per the context of data and circumstances
 |
| 1. Manage ethical performance
 | * 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.

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Interpersonal
* Communication
* Critical thinking
* Organizational
* Negotiation
* Monitoring
* Evaluation
* Record keeping
* Problem solving
* Decision Making
* Resource utilization
* Resource mobilization

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Work values and ethics
* Company policies
* Company operations, procedures and standards
* Occupational Health and safety procedures
* Fundamental rights at work
* Workplace communication
* Concept of time
* Time management
* Decision making
* Types of resources
* Work planning
* Organizing work
* Monitoring and evaluation
* Record keeping
* Gender mainstreaming
* HIV and AIDS
* Drug and substance abuse
* Professional growth and development
* Technology in the workplace
* Innovation
* Emerging 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. Conducted self-management
	2. Demonstrated interpersonal communication
	3. Demonstrated critical safe work habits
	4. Demonstrated the ability to lead a workplace team
	5. Planned and organized work
	6. Maintained professional growth and development
	7. Demonstrated workplace learning
	8. Demonstrated problem solving skills
	9. Demonstrated the ability to manage performance ethically
 |
| 1. Resource Implications
 | The following resources should be provided:1. Access to relevant workplace where assessment can take place
2. Appropriately simulated environment where assessment can take place
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

### DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** MIN/OS/GEM/BC/06/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate environmental literacy. It involves, controlling environmental hazard and environmental pollution, demonstrating sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs, monitoring activities on environmental protection/Programs , analyzing resource use and developing resource conservation plans

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Control environmental hazard
 | 1. Storage methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS.
2. Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS.
3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental Pollution
 | * 1. Environmental pollution ***control measures*** are implemented in accordance with international protocols.
	2. Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999
	3. Methods for minimizing noise pollution is complied with based on Noise and Excessive Vibration Pollution and Control Regulations, 2009
 |
| 1. Demonstrate sustainable resource use
 | * 1. Methods for minimizing wastage are complied with based on organizational waste management guide
	2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)
	3. Methods for economizing and reducing resource consumption are practiced as per the Constitution of Kenya 2010 Article 69 .
 |
| 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
	3. Current purchasing strategies are analyzed and recorded according to industry procedures.
	4. Current work processes to access information and data is analyzed following enterprise protocol.
 |
| 1. Identify environmental legislations/conventions for environmental concerns
 | 1. Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact
2. Industrial standard/environmental practices are described according to the different environmental concerns
 |
| 1. Implement specific environmental programs
 | 1. Programs/Activities are identified according to organizations policies and guidelines.
2. Individual roles/responsibilities are determined and performed based on the activities identified.
3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines
4. Stakeholders are consulted based on company guidelines
 |
| 1. Monitor activities on Environmental protection/Programs
 | 1. Activities are periodically monitored and Evaluated according to the objectives of the environmental program
2. Feedback from stakeholders are gathered and considered in Proposing enhancements to the program based on consultations
3. Data gathered are analyzed based on Evaluation requirements
4. Recommendations are submitted based on the findings
5. Management support systems are set/established to sustain and enhance the program
6. Environmental incidents are monitored and reported to
7. concerned/proper authorities
 |
| 1. Analyze resource use
 | 1. All resource consuming processes are Identified as per the organizational work plan
2. Quantity and nature of resource consumed is determined based on processes
3. Resource flow is analyzed as per different parts of the process.
4. Wastes are classified according to NEMA regulations on waste management.
 |
| 1. Develop resource Conservation plans
 | 9.1. Efficiency of use/conversion of resources is determined according to industry protocol.9.2. Causes of low efficiency of use of resources are Determined based on industry protocol.9.3. Plans for increasing the efficiency of resource use are developed based on findings. |

**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. 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
 |

**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
* Communication
* Writing

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* PPEs
* Environmental regulations
* OSHS
* Pollution
* Waste management
* Principle of 3Rs
* Types of resources
* Techniques in measuring current usage of resources
* Environmental hazards
* Regulatory requirements

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:* 1. Controlled environmental hazard
	2. Controlled environmental pollution
	3. Demonstrated sustainable resource use
	4. Evaluated current practices in relation to resource usage
	5. Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns.
	6. Described industrial standard environmental practices according to the different environmental issues/concerns.
	7. Resolved problems/ constraints encountered based on management standard procedures
	8. Implemented and monitored environmental practices on a periodic basis as per company guidelines
	9. Recommended solutions for the improvement of the program
	10. Monitored and reported to proper authorities any environmental incidents
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Workplace with storage facilities
	2. Tools, materials and equipment relevant to the tasks (e.g. Cleaning tools, cleaning materials, trash bags)
	3. PPE, manuals and references
	4. Legislation, policies, procedures, protocols and local ordinances relating to environmental protection
	5. Case studies/scenarios relating to environmental Protection
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through:* 1. Observation
	2. Oral questioning
	3. Written test
	4. Portfolio of Evidence
	5. Interview
	6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the –job
3. During Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

### DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** MIN/OS/GEM/BC/07/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to demonstrate occupational health and safety practices. It involves identifying workplace hazards and risks, identifying and implementing appropriate control measures to hazards and risks and implementing OSH programs, procedures and policies/guidelines.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms are elaborated in the Range*** |
| 1. Identify workplace hazards and risk
 | 1.1 ***Hazards*** in the workplace are identified ***based their indicators*** 1.2 Risks and hazards are evaluated based on legal requirements.1.3 ***OSH concerns*** raised by workers are addressed as per legal requirements.  |
| 1. Control OSH hazards
 | 2.1 Hazard prevention ***and control measures*** are implemented as per legal requirement.2.2 Risk assessment is conductedand a risk matrix developed based on likely impact.2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures. |
| 1. Implement OSH programs
 | 3.1 Company OSH program are identified, evaluated and reviewed based on legal requirements.3.2 Company OSH programs are implemented as per legal requirements.3.3 Workers are capacity built on OSH standards and procedures as per legal requirements3.4 ***OSH-related records*** are maintained as per legal requirements. |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Hazards may include but not limited to:
 | * Physical hazards – impact, illumination, pressure, noise,
* vibration, extreme temperature, radiation
* Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects
* Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors
* Ergonomics
* Psychological factors – over exertion/ excessive force,

awkward/static positions, fatigue, direct pressure,* varying metabolic cycles
* Physiological factors – monotony, personal relationship, work out cycle
* Safety hazards (unsafe workplace condition) –confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris
* Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work)
 |
| 1. Indicators may include but not limited to:
 | * Increased of incidents of accidents, injuries
* Increased occurrence of sickness or health complaints/ symptoms
* Common complaints of workers related to OSH
* High absenteeism for work-related reasons
 |
| 1. OSH concerns may include but not limited to:
 | * Workers’ experience/observance on presence of work hazards
* Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)
* Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines
 |
| 1. Safety gears /PPE (Personal Protective Equipment) may include but not limited to:
 | * Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest
 |
| 1. Appropriate risk controls

may include but not limited to: | * Appropriate risk controls in order of impact are as follows:
* Eliminate the hazard altogether (i.e., get rid of the dangerous machine)
* Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off)
* Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)
* Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage)
* Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users)
* Use personal protective equipment (i.e., wear
* gloves and goggles when using the machine)
 |
| 1. Contingency measures may include but not limited to:
 | * Evacuation
* Isolation
* Decontamination
* (Calling designed) emergency personnel
 |
| 1. Incidents and emergencies may include but not limited to:
 | * Chemical spills
* Equipment/vehicle accidents
* Explosion
* Fire
* Gas leak
* Injury to personnel
* Structural collapse
* Toxic and/or flammable vapors emission.
 |
| 1. OSH-related Records may include but not limited to:
 | * Medical/Health records
* Incident/accident reports
* Sickness notifications/sick leave application
* OSH-related trainings obtained
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

# COMMON UNITS OF COMPETENCY

### UNDERSTAND GEOLOGY PRINCIPLES

**UNIT CODE:** MIN/OS/GEM/BC/01/6/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
 | 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. |

### UNDERSTAND MINING TECHNOLOGY

**UNIT CODE:** MIN/OS/GEM/BC/02/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to understand mining technology. It involves understanding basic geotechnical properties, mining methods and mineral processing, mine safety and health practises, environmental impacts of mining and basic mineral economics and value chain.

**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 basic geotechnical properties
 | * 1. Samples of host rocks and ore is obtained based on geological report.
	2. Strength of host rocks is assessed according to geotechnical tests.
	3. Strength of mineral ore is assessed based on geotechnical tests.
	4. Geotechnical report is prepared as per the results.
 |
| 1. Understand mining methods and mineral processing
 | * 1. Open cast or underground mining method is selected based on geotechnical report.
	2. A decision is made on the ***extraction technique*** according to hard or soft rock.
	3. ***Mining tools and equipment*** are identified and selected according to job requirement
	4. Mineral ore characteristics are identified according to metallurgical test.
	5. A decision is made on ***mineral processing technique/*** beneficiation to be chosen according to metallurgical test report.
 |
| 1. Understand mine safety and health practices
 | * 1. Occupational safety and health is observed according to OSHA 2007.
	2. Geology of area is assessed for potential health hazards according to mineralogy (occurrence of minerals such as asbestos, radioactive elements )
	3. Mining methods are assessed for potential hazards according to mining technique.
	4. Mineral processing/ beneficiation are assessed for potential hazards according to SOPs.
	5. ***PPEs*** are identified and selected as per the job requirements
	6. Safety of animals and community around is observed according to environmental rules and regulations.
 |
| 1. Understand Environmental impacts of mining
 | * 1. Impact of opening a mine on the ecosystem is observed based on environmental regulations.
	2. Occupational safety and health is observed according to OSHA 2007
	3. ***Operational impacts*** are assessed according to regulatory standards.
	4. ***Mine closure*** is done according to approved mine closure plan and international best practice.
 |
| 1. Understand basic mineral economics and value chain
 | * 1. Mineral ore is assessed for value according to market demand
	2. The value of the mineral is assessed for benefits it confers on the society based on human development index.
 |

**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 minerals may include but not limited to:
 | * + Native elements
	+ Oxides
	+ Hydroxides
	+ Sulphites
	+ Sulphates
	+ Phosphates
	+ Carbonates
 |
| 1. Mining tools and equipment minerals may include but not limited to:
 | * + Excavator
	+ ETR
	+ Drills
 |
| 1. PPEs may include but not limited to:
 | * + Earmuffs
	+ boots
	+ Overall
	+ Dustcoats
	+ Gasmask
	+ Helmet with torch
	+ Goggles
	+ Gloves
 |
| 1. Mineral processing techniques may include but not limited to:
 | * + Physical( gravity, magnetic, sorting)
	+ Chemical (froth flotation, electrolysis, solvent extraction )
 |
| 1. Extraction techniques may include but not limited to:
 | * + Blasting
	+ Machine cutting
	+ Solution mining
	+ Dredging
 |
| 1. Operational impacts may include but not limited to:
 | * + Noise pollution
	+ Dust
	+ Vibrations
	+ Mine waste water
	+ Occupation safety and health
 |
| 1. Mine closure may include but not limited to:
 | * + Backfilling of pits
	+ Alternative use of pits
	+ Re-vegetation
	+ Alternative use of mine infrastructure
 |

**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:

**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
 | 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. 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/01/6/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, illuminating 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 color 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.
 |
| 1. Perform polarity test
 | * 1. Gemstone sample is obtained according to organizational procedures.
	2. Polarity test is performed using polariscope according to manufacturer’s manual and Standard operating procedures.
	3. Sample is mounted on the stage of Polariscope according to manufacturer’s manual
	4. Sample is tested and classified based on the identification standards.
	5. Result is recorded as a single or double refraction on a checklist according to gem identification chart
 |
| 1. Perform XRF test
 | * 1. Gemstone sample is obtained according to organizational procedures.
	2. XRF is obtained and calibrated according to manufacturer’s manual.
	3. ***Chemical composition*** of gemstone is obtained using X-RAY fluorescence according to manufacturer’s manual.
	4. Personal safety is observed as per manufacturer’s manual and OSHA 2007.
	5. The XRF is stored in a dust-free environment based on manufacturer’s specifications.
	6. Chemical composition results are recorded based on observation.
 |
| 1. Perform pleochroism test
 | * 1. Gemstone sample is obtained according to organizational procedures.
	2. The dichroscope is obtained and operated according to manufacturer’s manual.
	3. Gemstone is observed for pleochroism according to type of gemstone.
	4. Results are recorded on a checklist according to types and strength of colours observed.
	5. Dichroscope is stored in a dust-free environment according to manufacturer’s manual.
 |

**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. 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
 |
| 1. Chemical composition may include but not limited to:
 | * Aluminium Oxide
* Silicon Dioxide
* Calcium oxide
* Titanium oxide
* Magnesium oxide
 |

**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 equipments
* 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
10. Performed polarity test correctly
11. Obtained chemical composition of gemstones correctly
12. Performed pleochroism test 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. |

### PERFORM GEMSTONE GRADING

**UNIT CODE:** MIN/OS/GEM/CR/02/6/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 and grading by country of origin.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| --- | --- |
| 1. Grade gem stone by clarity
 | * 1. Samples are obtained according to organization procedures
	2. Samples are observed under natural light for ***inclusions***, breaks, fractures and bubbles according to SOPs
	3. ***Equipment and tools*** ***for clarity*** observations are acquired and set up according to user manual
	4. Samples are observed on the loupe/magnifying lens according to SOP
	5. Observations are recorded according to sample characteristic
	6. Samples are graded according to clarity
 |
| 1. Grade gem stone by cut
 | * 1. Equipment for gem cutting are obtained according to manufacturer’s standards
	2. Samples are collected according to institution specifications
	3. Observe sample parameters according to the ***physical characteristics of the samples***
	4. Diamond samples are observed according to brilliance and fire parameters
	5. Samples are ***cut*** to different shapes and styles to enhance color, carat weight and clarity according to characteristics of the sample
	6. Samples are graded according to cut
	7. Graded samples are recorded according to respective observation made and workplace procedures.
 |
| 1. Grade gem stone by colour
 | * 1. Samples are collected according to institutions standards
	2. ***Tools and equipment for color 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 color
 |
| 1. Grade by carat weight
 | * 1. Samples are obtained according to organizational standards
	2. Analytical weighing balance is identified and calibrated according to user manual
	3. Units of measurements are set in carats according to user manual.
	4. Sample weight is taken according to SOPs
	5. Readings are recorded according to SOPs
	6. Samples are graded according to carat weight
 |
| 1. Value gemstone by grading
 | * 1. Grading chart is used to determine the quality of gemstones based on the 4Cs
 |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

### CARRY OUT GEMSTONE PROCESSING

**UNIT CODE:** MIN/OS/GEM/CR/03/6/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. 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
* Hardness test
* Illumination
* Specific gravity
* Optical microscopy
 |
| 1. Gem identification chart may include but is not limited to:
 | * International reference chart developed by IGS for gemstone identification and classification
 |
| 1. Gem faceting machine/Plate may include but is not limited to:
 | * Crystalite plates 600, 293
* Tin lap 600, 293
 |
| 1. Cuts may include but is not limited to
 | * Brilliant
* Step cuts
* Free forms
* Cabochon
* Cushion
* Pavillion
* Crown
* Giddle
 |
| 1. Polishing powder may include but is not limited to
 | * Grit/Carborandum of different mesh
 |
| 1. Treatment may include but not limited to
 | * Heating/Enhancement
* Chemical
* Irradiation
* Surface coating
* Bleaching
* Cavity fillings
* Dyeing
* Fracture filling
 |
| 1. Tools, equipment and reagents may include but not limited to:
 | * Dye
* Bleaching agents
* Sugar and smoke treatment
* Fillers
* Electromagnetic radiation
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Identified gemmological stone correctly
2. Carried out gemstone identification tests correctly
3. Performed gemstone cutting correctly
4. Operated the gem faceting machine correctly
5. Observed personal safety when cutting appropriately
6. Conducted gemstone pre-shaping correctly
7. Performed gemstone faceting correctly
8. Performed gemstone polishing correctly
9. Performed gemstone treatment correctly
 |
| 1. Resource Implications
 | The following resources should be provided:* 1. Gemstone sample
	2. Gem velvet cloth
	3. Microscope
	4. Refractometer
	5. Dichroscope
	6. Polariscope
	7. Tweezers or a gem holder
	8. Callipers or a micrometre
	9. Moh’s Scale
	10. Light source
	11. Hydrostatic balance beam scale
	12. Heavy liquids
	13. Loupe(10x)
	14. Crystal models
	15. Refractive index fluid
	16. Samples of rough & cut gemstone
	17. Gem faceting machine
	18. Gem polishing plates
	19. Caborandum and grit
	20. Treatment chemicals and heat source
 |
| 1. Methods of Assessment
 | Competency may be assessed through:* 1. Practical Assessment
	2. Written
	3. Case Study/Situation
	4. Observation/Demonstration and oral questioning
 |
| 1. Context of Assessment
 | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.  |
| 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/04/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to design jewellery products. It involves identifying precious metals, sketching, designing and illustrating jewellery product, Alloying/plating jewellery products, implementing jewellery design and conducting jewellery finishing

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**These describe the key outcomes that make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| --- | --- |
| 1. identify required materials
 | * 1. Specific ***jewellery materials*** are obtained according to organisational procedures
	2. Tools and equipment are identified and prepared for use based on job requirements.
	3. The jewellery design is obtained according to organisational procedures.
 |
| 1. Craft jewellery products
 | * 1. The jewellery design is examined for details according to design provided.
	2. Personal safety is observed according to OSHA 2007.
	3. ***Crafting tools and equipment*** are identified and gathered based on standard operating procedures.
	4. Materials are cut, moulded or soldered as per the design requirements
	5. 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
* Jewellary finishing
* Designing
* Qualifying and quantifying
* Valuation
* Packaging and staging
* exhibition

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate:1. Designed a sketch appropriately
2. Documented the design process correctly
3. Visualized the design using CAD software correctly
4. Polished jewellery using appropriate tools correctly
5. Packaged the jewellery with appropriate packaging materials appropriately
6. Displayed jewellery in the appropriate stands correctly
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Computer and internet
	2. Stationery
	3. Gemstones
	4. Gemological instruments and equipment
	5. Digital camera
	6. Data management software
 |
| 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. |

### CARRYOUT GEMSTONE MARKETING

**UNIT CODE:** MIN/OS/GEM/CR/05/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to perform gemstone marketing. It involves identifying gemmological stones, understanding mine to market value chain, understanding world market prices, establishing linkages with suppliers and advertising gemstone products.

**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 gemstones and jewellery products
 | 1. Specific gemstone and jewellery are obtained according to organizational procedures
2. Gem and jewellery ***identification tests*** are carried out according to job specifications.
3. Personal safety precautions are followed as per requirement of work and OSHA 2007
4. Results interpreted according to organizational procedures.
 |
| 1. Understand mine to market value chain
 | * 1. Sources of raw materials are identified based on desired product.
	2. Cost of raw materials is assessed according to availability
	3. Cost of processing raw materials is assessed based on availability of equipment and skills.
	4. ***4Cs*** of the gems are assessed as per SOPs
	5. Metals and alloys used for jewellery crafting are assessed based on purity and weight.
	6. Markets are assessed based on demand-supply dynamics.
	7. Gemstone and jewellery prices are evaluated as per current world market prices
 |
| 1. Understand world market prices
 | * 1. Gemstone prices is evaluated as per current world market prices
	2. Correct calculations of price are performed as per the market prices.
	3. A price which is appealing for customers is determined as per social awareness
	4. 4Cs of the gems is assessed as per SOPs
 |
| 1. Establish linkages with suppliers
 | * 1. Suppliers of gemstones and other requirements are established as per supplier relationship management system.
	2. Fresh sources of gemstones are sought out as per organizational procedures
	3. Risks are constantly evaluated as per supplier relationship management system.
 |
| 1. Advertise gemstone products
 | * 1. Effective ***media*** for promotion of the product is selected according to organizational set up.
	2. Relevant group of customers is targeted as per advertisement specifications.
	3. Promotion of gemstones is conducted according to advertisement specifications.
	4. The need of potential market is ascertained as per organizational procedures
 |
| 1. Distribute gemstone products
 | * 1. Economical distribution line is arranged as per the organisational procedures.
	2. Distribution ***targets*** is set according to consumer’s specifications.
	3. Sales record of different ***gemstone products*** is maintained according to organisational set up.
	4. A record of retailers and customers is maintained according to organisational 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. Packaging materials may include but is not limited to:
 | * Glass
* Paper and board
* Bamboo
* Cork
* Plastics
 |
| 1. Identification tests may include but not limited to:
 | * XRF test
* Pleochroism test
* Polarity
* Refractive index
* Specific gravity
 |
| 1. 4c may include but is not limited to:
 | * Colour
* Cut
* Clarity
* Carat
 |
| 1. Media may include but is not limited to:
 | * Online Advertising (aka Digital)
* Cell Phone & Mobile Advertising
* Print Advertising
* Broadcast Advertising
* Product Placement Advertising
* Outdoor Advertising
 |
| 1. Target may include but is not limited to:
 | * Jewellery shop
* Laboratory research
* Auction house
* Museum specialist
* Appraiser
* Educator
 |
| 1. Gemstone product may include but is not limited to:
 | * Gemstone Bracelets
* Gemstone Necklaces
* Gemstone Beads
* Gemstone Pendants
* Gemstone Cabochons
 |

**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 skills
* Computing and calculation
* Communication
* Interpersonal
* Auctioning gemstones
* Gem tour promotions
* Public speaking
* Pricing and valuation
* Packaging of products
* Conducting promotional activities
* Identification of gemstones

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Internet and social media knowledge
* Channels of distribution
* Information on work specifications, standard operating procedures
* Packing of products, labelling and designing the product material
* Price fluctuation in the market
* Advertisement standards and marketing techniques

**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. Packaged the gemstone correctly
2. Evaluated gemstone prices correctly
3. Performed gemstone advertisement correctly
4. Distributed gemstone products correctly
 |
| 1. Resource Implications
 | The following resources should be provided:2.1 gemstone sample2.2 calculator |
| 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. |

### CARRYOUT GEMOLOGICAL STONES QUALITY ASSURANCE

**UNIT CODE: UNIT CODE:** MIN/OS/GEM/CR/06/6/A

**UNIT DESCRIPTION**

This unit specifies the competencies required to operate gemmological machines and equipment. It involves preparing work pieces, preparing workstation, setting up machines and equipment, performing machine operations and identifying faulty machines

 **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 gemstone international standards
 | * 1. Reference materials are gathered like publications, journals and other secondary materials according to project requirement
	2. A comparison is made between the difference standards of each organisation
	3. A chart is drawn based on the conclusions and findings from the research work.
	4. Gemstones are arranged in correct sequence according to the international standards( in accordance with workplace procedures and jobspecifications)
 |
| 1. Identify gemstone certification bodies
 | * 1. Acquire publications and reference materials detailing the existing international bodies
	2. An extensive research is done on the roles of each body
	3. A comparative study is done on the similarities and differences of each body
	4. Records are kept in accordance with workplace procedures.
 |
| 1. Test gemstones
 | * 1. A flow chart/reference material detailing the international standards is obtained
	2. Samples are obtained according to organisational specifications.
	3. ***Gemmological machines*** are set up and adjusted in accordance with manufacturer’s instructions, workplace requirements and specifications for the work
	4. Gemmological machines are operated according to manufacturer’s manual.
	5. Samples are tested for accepted international standards
	6. Results and conclusions are drawn and recorded according to job specification and international standards
 |
| 1. Understand ethical mining
 | * 1. Acquiring the mining Act. 2016, according to the ministry of Mining rules and regulations
	2. A research on the components of ethical mining is carried out, which include human rights, social welfare, environmental concerns, water use, safety guidelines, CSR etc.
	3. Non- poisonous reagents are used when mining according to ICA standards.
 |

**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** |
| * Gemstones may include but is not limited to:
 | * Diamond
* Ruby
* Sapphire
* Emerald
 |
| * International certified bodies may include but not limited to
 | * American Gem society
* American gem grade organisation
* International coloured stone association
* Gemmological institute of America
* Jewellery information centre
* Jewellers of America
* Jewellers vigilance committee
 |
| * Ethical mining specifications may include but not limited to
 | * Safety regulations
* Health regulations
* Environmental concerns
* Social welfare
* Taxation
* Human rights
* Water use
 |

**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:

* Disposal of waste
* Setting up of gemological machinery
* Analytical Skills
* Teamwork
* Identify and report workplace hazards
* Problem solving
* Decision making
* Concentration
* Attention to detail
* Able to follow instructions and production schedules
* Able to act quickly when a problem arises
* Follow workplace procedures for accidents and emergency situations
* Carry out work, including the operation of relevant machinery/equipment, according to
workplace occupational health and safety procedures

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of gemstones
* Gemstone certification bodies
* ICA standards
* Ethical mining
* Knowledge on how to test gemstones
* duty of care to self, others and the environment
* Workplace procedures applicable to health and safety in the workplace requirements for operating machinery and equipment.
* NEMA regulations
* Workplace occupational health and safety policies and procedures related to the job role or function
* Safe operating procedures for relevant machinery/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. Assessed quality of gemstones appropriately
2. Knowledge of international standards appropriately
3. Knowledge of international certified bodies appropriately
4. Understand ethical mining appropriately
5. Kept gemmological records appropriately
 |
| 1. Resource Implications
 | The following resources should be provided:2.1 journals, publication, relevant documents 2.2 PPE2.3 Gemological equipment2.5 Gemstones2.6 Gemological machinesMining Act 2016 |
| 1. Methods of Assessment
 | Competency may be assessed through:3.1 Portfolio Assessment3.2 Oral 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. |

### MANAGE GEMMOLOGY PROJECTS

**UNIT CODE:** MIN/OS/GEM/CR/07/6/A

**UNIT DESCRIPTION**

This unit describes the competencies required by a technician in order to manage gemmology projects. It involves identifying gemmology project, coordinating activities for gemmology projects, coordinating personnel for gemmology projects, analysing and documenting gemmology project activities

**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 gemology projects
 | 1. Initial task of gemmology project and document is inspected and analysed according to project needs
2. Appropriate technology and technical resources are selected according to project necessity
3. Project risk analysis and possible modifications are made according project needs
4. Project negotiations are initiated and effected according to client needs
 |
| 1. Coordinate activities for gemology projects
 | * 1. Action plan and project phases is prepared according to project specifications
	2. Tasks and responsibilities are delegated according to project specifications
	3. Tools, equipment and materials are delivered and stored according project requirements
	4. Track is done to ensure ***project conformity*** according to project requirements
 |
| 1. Coordinate personnel for gemology projects
 | * 1. Personnel on gemmology projects are supervised according to project activities
	2. Project duties are delegated according to project requirements
	3. Personnel are hired according to project requirements
	4. Staff members on gemmology projects are appraised according to work performance
	5. Personnel project roster is maintained according to project requirements
 |
| 1. Analyze and documents gemology project activities
 | * 1. ***Project related activities*** are analysed according to Standard operating procedures
	2. Project activities are documented according to project analysis
	3. ***Project documentation*** is managed according SOPs
	4. Project reports are prepared according to project 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. Project conformity may include but is not limited to:
 | * Project budget
* Project quality
* Project schedule
 |
| 1. Tools and equipment may include but is not limited to:
 | * Loupe
* Microscope
* Dicroscope
* Machines
 |
| 1. Project related activities may include but is not limited to:
 | * Risk prevention and management
* Quality assurance
* Time management
* Performance improvement
 |
| 1. Project documentation may include but is not limited to:
 | * Receipts
* LPOs
* Delivery notes
* Work schedule
* Working time records
* Certificates and permits
 |
| 1. Set standards may include but is not limited to:
 | * ISO
* KEBS
* BS
* API
* IEEE
 |

**REQUIRED KNOWLEDGE**

***The individual needs to demonstrate knowledge of:***

* Project management
* Documentation
* Scheduling/planning for maintenance
* Resource allocation
* Quality control and assurance
* Measurement and instrumentation
* Technical drawing
* Risk assessment
* Standard units used in fluids

**REQUIRED SKILLS**

***The individual needs to demonstrate skills in:***

* Measurements
* Equipment inspection and testing
* Communication skills
* Problem solving
* Data collection and analysis
* Documentation
* Management
* Project development
* Attention to details

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency.
 | * 1. Selected and planned gemmology project technology
	2. Coordinated activities for gemmology projects
	3. Coordinated personnel for gemmology projects
	4. Analyzed and documented gemmology project activities
	5. Managed quality control of gemmology projects
 |
| 1. Resource Implications.
 | * 1. Computers
	2. Whiteboards
	3. Whiteboard markers
	4. Manuals
	5. Manila papers
	6. Gemmology tool box
	7. Gemmology laboratory
	8. Machines
 |
| 1. Methods of Assessment.
 | ***Competency may be assessed through:**** 1. Practical
	2. Observation
	3. Questionnaire
	4. Case studies
	5. Written examinations
	6. Oral presentation
 |
| 1. Context of Assessment.
 | * 1. Competency may be assessed individually in an actual workplace or in work-simulated conditions within accredited institutions or during industrial attachment
 |
| 1. Guidance information for assessment.
 | * 1. This unit may be assessed on an integrated basis with others within this occupational sector.
 |