****

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**GEOPHYSICAL EXPLORATION ASSISTANT TECHNICIAN**

**LEVEL 5**

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# FOREWORD

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

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). 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 Geophysical Exploration Technology. These Occupational Standards will also be the basis 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 Extractive 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 and Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Kabete National Polytechnic have developed these Occupational Standards for Geophysical Exploration Technicians. These standards will be the basis for development of competency-based curriculum for Geophysical Exploration Technology Certificate Level 5.

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

I am grateful to the Council Members, Council Secretariat, Extractives 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 thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to Extractives Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards.

My gratitude and appreciation go to Kabete National Polytechnic for their contribution towards the development of these Standards. I also 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**

**EXTRACTIVES SECTOR SKILLS ADVISORY COMMITTEE**

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# ABBREVIATIONS AND ACRONYMS

BC Basic Competency

CC Common Competency

CDACC Curriculum Development Assessment and Certification Council

CR Core Competency

EMCA Environmental Management and Co-ordination Act

GIS Geographical Information System

GPE Geophysical Exploration

GPR Ground Penetrating Radar

GPS Global Positioning System

ICT Information Communication Technology

KNQA Kenya national Qualification Authority

LCD Liquid Crystal Display

NEMA National Environment Management Authority

OS Occupational Standards

OSH Occupation Safety and Health

OSHA Occupation Safety and Health Act

OSHS Occupational Safety and Health Standards

PPE Personal Protective Equipment

SSAC Sector Skills Advisory Committee

TV Television

TVET Technical and Vocational Education and Training

TVETA Technical and Vocational Education and Training Authority

# KEY TO UNIT CODE

 **EXT /OS /GPE /BC /01/ 5/A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# OVERVIEW

Geophysical Exploration Technology Level 5 qualification consists of competencies that an individual must achieve to provide assistance to a geophysical exploration technician. This involves surveying area: geology, density, magnetism, seismicity and resistivity and conducting geophysical well logging.

The units of learning for Geophysical Exploration Technology level 5 qualifications include the following:

**Basic Units of competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| EXT/OS/GPE/BC/01/5/A | Demonstrate communication skills |
| EXT/OS/GPE/BC/02/5/A | Demonstrate digital literacy |
| EXT/OS/GPE/BC/03/5/A | Demonstrate entrepreneurial skills |
| EXT/OS/GPE/BC/04/5/A | Demonstrate employability skills |
| EXT/OS/GPE/BC/05/5/A | Demonstrate environmental literacy |
| EXT/OS/GPE/BC/06/5/A | Demonstrate occupational safety and health practices |

**Common units of competency**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| EXT/OS/GPE/CC/01/5/A | Apply mathematics for geophysical exploration |
| EXT/OS/GPE/CC/02/5/A | Apply chemistry for geophysical exploration |
| EXT/OS/GPE/CC/03/5/A | Apply physics for geophysical exploration |

**Core Units of Learning**

| **Unit Code** | **Unit Title** |
| --- | --- |
| EXT/OS/GPE/CR/01/5/A | Survey area geology  |
| EXT/OS/GPE/CR/02/5/A | Survey area gravity |
| EXT/OS/GPE/CR/03/5/A | Survey area magnetism |
| EXT/OS/GPE/CR/04/5/A | Survey area seismicity  |
| EXT/OS/GPE/CR/05/5/A | Survey area resistivity  |
| EXT/OS/GPE/CR/06/5/A | Conduct geophysical well logging |

# BASIC UNITS OF COMPETENCY

# DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** EXT/OS/GPE/BC/01/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Active listening
* Giving/receiving feedback
* Interpretation of information
* Role boundaries setting
* Negotiation
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

# DEMONSTRATE NUMERACY SKILLS

**UNIT CODE:** EXT/OS/GPE/BC/02/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range.*** |
| 1. Calculate with whole numbers and familiar fractions, decimals and percentages for work | 1. Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted as per SOPs
2. Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended as per SOPs
3. Calculations which may involve a number of steps are performed as per SOPs
4. Calculations done with whole numbers and routine or familiar fractions, decimals and percentages as per SOPs
5. Conversion between equivalent forms of fractions, decimals and percentages is done as per SOPs
6. Order of operations is applied to solve multi-step calculations as per SOPs
7. Problem solving strategies are appropriately applied as per SOPs
8. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per SOPs
9. Formal and informal mathematical language and symbolism are used to communicate the result of the task as per SOPs.
 |
| 2. Estimate, measure, and calculate with routine metric measurements for work | 1. Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements
2. Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements
3. Measurements are estimated and made using correct units as per measurement manuals.
4. Estimations and calculations done as per routine measurements
5. Conversions performed routinely as per metric units
6. Problem solving processes are used to undertake the tasks as per workplace procedures.
7. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures
8. Information is recorded using mathematical language and symbols appropriate to discuss the task as per workplace procedures.
 |
| 3. Use routine maps and plans for work | 1. Features are identified in routine maps and plans as per SOPs
2. Symbols and keys in routine maps and plans are clearly explained as per SOPs
3. Orientation of map to North is identified and interpreted as per SOPs
4. Understanding of direction and location is clearly demonstrated as per SOPs
5. Simple scale is applied to estimate length of objects, or distance to location or object as per SOPs
6. Directions are given and received using both formal and informal language as per SOPs
 |
| 4. Interpret, draw and construct 2D and 3D shapes for work | 1. Two dimensional shapes and routine three dimensional shapes identified in everyday objects and in different orientations in accordance with job specifications
2. The use and application of shapes elaborately explained as per SOPs
3. Formal and informal mathematical language and symbols used to describe and compare the features of two dimensional shapes and routine three dimensional shapes as per workplace procedures.
4. Common angles identified in accordance with SOPs
5. Common angles in everyday objects are appropriately estimated as per SOPs
6. Formal and informal mathematical language are used to describe and compare common angles as per workplace procedures.
7. Common geometric instruments used to draw two dimensional shapes as per SOPs
8. Routine three dimensional objects constructed from given nets as per SOPs.
 |
| 5. Interpret routine tables, graphs and charts for work | 1. Routine tables, graphs and charts identified in predominately familiar texts and contexts as per tables and graph manuals
2. Common types of graphs and their different uses identified as per SOPs
3. Features of tables, graphs and charts identified as per workplace procedures
4. Information in routine tables, graphs and charts located and interpreted as per workplace procedures
5. Calculations are perform to interpret information as per SOPs
6. How statistics can inform and persuade interpretations is explained as per SOPs
7. Misleading statistical information is identified as per workplace procedures.
8. Information relevant to the workplace is discussed as per workplace procedures.
 |
| 6. Collect data and construct routine tables and graphs for work | 1. Features of common tables and graphs identified as per SOPs
2. Uses of ***different tables and graphs*** identified as per job specifications
3. Data and variables to be collected are determined as per workplace procedures.
4. The audience is determined as per the workplace procedures
5. Method of data collection is select as per job requirement
6. Data is collected as per SOPs
7. Information is collated in a table as per SOPs
8. Suitable scale and axes determined as per job specifications
9. Graph to present information is drafted and drawn as per SOPs
10. Data checked to ensure that it meets the expected results and context as per workplace procedures
11. Information is reported or discussed using formal and informal mathematical language as per workplace procedures
 |
| 7. Use basic functions of calculator | * 1. Keys are identified and used for ***basic functions on a calculator*** as per SOPs
	2. Calculation is done using whole numbers, money and routine decimals and percentages as per SOPs
	3. Calculation done with routine fractions and percentages as per SOPs
	4. Order of operations is applied to solve multi-step calculations as per SOPs
	5. Results are interpreted, displayed and recorded as per workplace procedures
	6. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures
	7. Formal and informal mathematical language and appropriate symbolism and conventions used to communicate the result of the task as per workplace procedures.
 |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Measuring
* Logical thinking
* Computing
* Drawing of graphs
* Applying mathematical formulas
* Analytical

**Required knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate:1. Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages
2. Estimated, measured and calculated with routine metric measurements
3. Applied simple scale to estimate length of objects or distance to location or object
4. Used formal and informal mathematical language to describe and compare common angles
5. Used common geometric instruments to draw two dimensional shapes
6. Collected data and constructed routine tables and graphs
7. Used basic functions of calculator correctly
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Access to relevant workplace or appropriately simulated environment where assessment can take place
2. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Observation
2. Oral questioning
3. Written test
4. Portfolio of Evidence
5. Interview
6. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed in:1. On the job
2. Off the job
3. Industrial attachment
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

**DEMONSTRATE DIGITAL LITERACY**

**UNIT CODE:** EXT/OS/GPE/BC/03/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

**DEMONSTRATE ENTREPRENEURIAL SKILLS**

**UNIT CODE :** EXT/OS/GPE/BC/04/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

# DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** EXT/OS/GPE/BC/05/5/A

**Unit Description**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

|  |  |
| --- | --- |
| **Range** | **Variable** |
| 1. Drug and substance abuse may include but not limited to:
 | Commonly abused* Alcohol
* Tobacco
* Miraa
* Over-the-counter drugs
* Cocaine
* Bhang
* Glue
 |
| 1. Feedback may include but not limited to:
 | * Verbal
* Written
* Informal
* Formal
 |
| 1. Relationships may include but not limited to:
 | * Man/Woman
* Trainer/trainee
* Employee/employer
* Client/service provider
* Husband/wife
* Boy/girl
* Parent/child
* Sibling relationships
 |
| 1. Forms of communication may include but not limited to:
 | * Written
* Visual
* Verbal
* Non verbal
* Formal and informal
 |
| 1. Team may include but not limited to:
 | * Small work group
* Staff in a section/department
* Inter-agency group
 |
| 1. Personal growth may include but not limited to:
 |

|  |
| --- |
| * Growth in the job
* Career mobility
* Gains and exposure the job gives
* Net workings
* Benefits that accrue to the individual as a result of noteworthy performance
 |

 |
| 1. Personal objectives may include but not limited to:
 | * Long term
* Short term
* Broad
* Specific
 |
| 1. Trainings and career opportunities may include but not limited to
 | * Participation in training programs
* Technical
* Supervisory
* Managerial
* Continuing Education
* Serving as Resource Persons in conferences and workshops
 |
| 1. Resource may include but not limited to:
 | * Human
* Financial
* Hardware
* Software
 |
| 1. Innovation may include but not limited to:
 | * New ideas
* Original ideas
* Different ideas
* Methods/procedures
* Processes
* New tools
 |
| 1. Emerging issues may include but not limited to:
 | * Terrorism
* Social media
* National cohesion
* Open offices
 |
| 1. Range of media for learning may include but not limited to:
 | * Mentoring
* peer support and networking
* IT and courses
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

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

# DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** EXT/OS/GPE/BC/06/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**These are assessable statements which specify the required level of performance for each of the elements.***Bold and italicized terms*** ***are elaborated in the Range*** |
| 1. Control environmental hazard
 | 1. ***Storage methods*** for environmentally***hazardous*** materials are strictly followed according to environmental regulations and OSHS.
2. ***Disposal methods*** of hazardous wastes are followed always according to environmental regulations and OSHS.
3. ***PPE*** is used according to OSHS.
 |
| 1. Control environmental Pollution control
 | 1. Environmental pollution ***control measures*** are compiled following standard protocol.
2. Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999
3. Methods for minimizing ***noise pollution*** is complied with based on Noise and Excessive Vibration Pollution and Control Regulations, 2009
 |
| 1. Demonstrate sustainable resource use
 | 1. Methods for minimizing wastage are complied with.
2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)
3. Methods for economizing and reducing resource consumption are practiced as per the Environmental Management and Coordination Act 1999
 |
| 1. Evaluate current practices in relation to resource usage
 | 1. Information on resource efficiency **systems and procedures** are collected and provided to the work group where appropriate.
2. Current resource usage is measured and recorded by members of the work group.
3. Current purchasing strategies are analyzed and recorded according to industry procedures.
4. Current work processes to access information and data is analyzed following enterprise protocol.
 |
| 1. Identify Environmental legislations/conventions for environmental concerns
 | 1. Environmental ***legislations/conventions*** and local ordinances are identified according to the different ***environmental aspects/impact***
2. ***Industrial standard/environmental practices*** are described according to the different environmental concerns
 |
| 1. Implement specific environmental programs
 | 1. Programs/Activities are identified according to organizations policies and guidelines.
2. Individual roles/responsibilities are determined and performed based on the activities identified.
3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines
4. Stakeholders are consulted based on company guidelines
 |
| 1. Monitor activities on Environmental protection/Programs
 | 1. Activities are periodically monitored and evaluated according to the objectives of the environmental Program
2. Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations
3. Data gathered are analyzed based on evaluation requirements
4. Recommendations are submitted based on the findings
5. Management support systems are set/established to sustain and enhance the program
6. Environmental incidents are monitored and reported to concerned/proper authorities
 |

**RANGE**

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

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

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Observation
* Measuring
* Writing
* Communication
* Analytical
* Monitoring
* Evaluation

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

# DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** EXT/OS/GPE/BC/07/5/A

**UNIT DESCRIPTION**

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

**ELEMENTS AND PERFORMANCE CRITERIA**

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

**RANGE**

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

| **Variable** | **Range** |
| --- | --- |
| 1. Hazards may include but are not limited to:
 | * Physical hazards
* Biological hazards
* Chemical hazards
* Ergonomics
* Psychological factors
* Physiological factors
* Safety hazards
* Unsafe workers’ act
 |
| 1. Indicators may include but are not limited to:
 | * Increased of incidents of accidents, injuries
* Increased occurrence of sickness or health complaints/ symptoms
* Common complaints of workers related to OSH
* High absenteeism for work-related reasons
 |
| 1. Evaluation and/or work environment measurements may include but are not limited to:
 | * Health Audit
* Safety Audit
* Work Safety and Health Evaluation
* Work Environment Measurements of Physical and Chemical Hazards
 |
| 1. OSH issues and/or concerns may include but are not limited to:
 | * Workers’ experience/observance on presence of work hazards
* Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)
* Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines
 |
| 1. Prevention and control measures may include but are not limited to:
 | * Eliminate the hazard
* Isolate the hazard
* Substitute the hazard with a safer alternative
* Use administrative controls to reduce the risk
* Use engineering controls to reduce the risk
* Use personal protective equipment
* Safety, Health and Work Environment Evaluation
* Periodic and/or special medical examinations of workers
 |
| 1. Safety gears /PPE (Personal Protective Equipment’s) may include but are not limited to:
 | * Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest
 |
| 1. Appropriate risk controls
 | * Eliminate the hazard altogether
* Isolate the hazard from anyone who could be harmed
* Substitute the hazard with a safer alternative
* Use administrative controls to reduce the risk
* Use engineering controls to reduce the risk
* Use personal protective equipment
 |
| 1. Contingency measures may include but are not limited to:
 | * Evacuation
* Isolation
* Decontamination
* Emergency personnel
 |
| 1. Emergency procedures may include but are not limited to:
 | * Fire drill
* Earthquake drill
* Basic life support/CPR
* First aid
* Spillage control
* Decontamination of chemical and toxic
* Disaster preparedness/management
* Set of fire-extinguisher
 |
| 1. Incidents and emergencies may include but are not limited to:
 | * Chemical spills
* Equipment/vehicle accidents
* Explosion
* Fire
* Gas leak
* Injury to personnel
* Structural collapse
* Toxic and/or flammable vapors emission.
 |
| 1. OSH-related Records may include but are not limited to:
 | * Medical/Health records
* Incident/accident reports
* Sickness notifications/sick leave application
* OSH-related trainings obtained
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

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

**Required Knowledge**

The individual needs to demonstrate knowledge of:

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

**EVIDENCE GUIDE**

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

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

# COMMON UNITS OF COMPETENCY

# APPLY MATHEMATICS PRINCIPLES

**UNIT CODE: EXT/OS/GPE/CC/01/5/A**

**UNIT DESCRIPTION:**

This unit describes the competencies required to apply Technician mathematics. It involves applying: algebra, trigonometry, calculus, statistics, mensuration and matrices.

This standard applies in the Extractives sector.

**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 Algebra
 | * 1. ***Mathematical operations*** are performed based on BODMAS rule.
	2. Calculations involving Indices are performed as per the concept
	3. Calculations involving Logarithms are performed as per the concept
	4. Scientific calculator is used in solving mathematical problems in line with manufacturer’s manual
	5. Simultaneous equations are solved as per the rules
	6. Roots of quadratic equations are calculated as per the concept.
 |
| * 1. Apply Trigonometry principles
 | * 1. Field measurements are determined as per ***trigonometric functions.***
	2. Trigonometric rules and ***identities*** are applied based on quantities of measurements.
	3. Calculations are performed using trigonometric rules.
 |
| * 1. Apply Calculus
 | * 1. Derivatives of algebraic functions are determined using differentiation.
	2. Rate of change and small change are determined using differentiation.
	3. Calculation involving stationery points of functions of two variables are performed using differentiation.
	4. Integrals of algebraic functions are determined using integration.
	5. Integrals of trigonometric functions are determined using integration.
	6. Integrals of logarithmic functions are determined using integration.
 |
| * 1. Carry out Mensuration
 | * 1. Perimeter and areas of figures are measured and calculated.
	2. Volume and surface area of solids are calculated.
	3. Areas of irregular figures are obtained.
 |
| * 1. Apply Statistics
 | * 1. Data collection and presentation is conducted based statistical procedures.
	2. Mean, median ,mode and Standard deviation are obtained from given data
	3. Calculations are performed based on Laws of probability
	4. Calculation involving ***probability distributions*,** mathematical expectation sampling distributions are performed.
	5. Sampling distribution methods are applied in data analysis
 |
| * 1. Apply Matrix
 | * 1. Determinant and inverse of 2x2 matrix are obtained
	2. Solutions of simultaneous equations are obtained
	3. Calculation involving Eigen values and Eigen vectors are performed
 |

**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. Mathematical operations may include but not limited to:
 | * Brackets
* Of
* Division
* Multiplication
* Addition
* Subtraction
 |
| 1. Trigonometric functions may include but not limited to:
 | * Sin x
* Cos x
* Tan x
 |
| 1. Trigonometric identities may include but not limited to:
 | * Squares of trigonometric functions
* Compound angles
* Half angles
 |
| 1. Probability distributions may include but not limited to:
 | * Binomial
* Poisson
* Normal
 |

**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
* Communication
* Logical thinking
* Problem solving
* Drawing
* Sketching
* Interpersonal
* Organization

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Mensuration
* Matrix operations
* Calculus
* Statistics
* Algebra
* Trigonometry functions

**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. Applied algebra correctly.
2. Applied Trigonometry and hyperbolic functions correctly.
3. Applied Calculus correctly.
4. Carried out mensuration correctly.
5. Applied Matrix correctly.
6. Applied statistics correctly.
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Access to relevant workplace or appropriately simulated environment where assessment can take place
	2. Measuring equipment
	3. Materials relevant to the proposed activity or tasks
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Written tests
2. Observation
3. Oral Questioning
4. Interview
 |
| 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. |

# APPLY CHEMISTRY PRINCIPLES

**UNIT CODE: EXT/OS/GPE/CC/02/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to apply chemistry principles in geophysical exploration. It involves applying inorganic chemistry, organic chemistry and physical chemistry in the workplace.

This standard applies in the Extractives sector

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  | **PERFORMANCE CRITERIA*****(Bold and italicized terms are elaborated in the Range)*** |
| --- | --- |
| 1. Apply inorganic chemistry
 | 1.1 ***Elements*** and their properties are reviewed based on their structure.1.2 The particulate nature of matter is explored based on kinetic theory.1.3 ***Isotopes*** are explored based on their stability and their radiogenic properties. 1.4 Atoms are explored in terms structure and bonding. 1.5 The periodic table is explored as per groups and periods. 1.6 ***Transition elements*** are explored based on their physical properties and uses.1.7 ***Minerals and Ores*** are explored in terms of their importance and extraction techniques.1.8 Nuclear chemistry is explored in terms of energy of the nuclear, radioactivity and their applications.  |
| 1. Apply organic chemistry
 | 1. ***Organic compounds*** are identified and studied based on general properties and sources.
2. Organic compounds are classified and named based on composition and structure.
3. Organic compounds are identified and studied based on their biological importance and formation processes.
4. Distribution of organic compounds is studied based on their occurrence in water and soils.
5. ***Geochemical properties*** of organic compounds are studied based on their complexing and adsorbent behaviour.
6. ***Organic minerals*** are studied based on formation and composition.
7. Effects of organic compounds are studied based of carbon cycle.
 |
| 1. Apply physical chemistry
 | * 1. Phase equilibrium of elements is explored in terms of physical, chemical and homogeneity properties.
	2. ***Acids and bases*** are explored based on their definition, reactions, classification and their properties.
	3. Reduction and Oxidation reactions are explored in terms their potentials and conditions.
	4. Aqueous chemistry is explored in terms of equilibrium and chemical reactivity.
 |

**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. Organic compounds may include but is not limited to:
 | * Hydrocarbons
* Alkylhalides
* Aromatic compounds
* Hydroxyl compounds/ alcohol
* Carbonyl compounds
* Carboxylic acids
* Esters
* Organo-nitrogen compounds
* Polymers
 |
| 1. Geochemical properties may include but is not limited to:
 | * Acid-base properties
* Adsorption
 |
| 1. Organic minerals may include but is not limited to:
 | * Coal
* Oil
* Hydrocarbon gas
 |
| 1. Elements include but not limited to:
 | * Hydrogen
* Oxygen
* Sodium
* Nitrogen
 |
| 1. Isotopes include but not limited to:
 | * Oxygen- 16, 18
* Carbon -12, 13, 14
* Hydrogen -2, 1
 |
| 1. Transition elements include but not limited to:
 | * Iron
* Copper
* Chromium
* Manganese
* Magnesium
 |
| 1. Minerals may include but not limited to:
 | * Quartz (Silica)
* Calcite
* Magnetite
* Apatite
 |
| 1. Ores may include but not limited to:
 | * Iron ores
* Magnesium ores
* Lead ores
* copper ores
 |
| 1. Acids and bases include but not limited to:
 | * Acids :
* Organic
* Inorganic
* Bases:
* Soluble
* insoluble
 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills**

The individual needs to demonstrate the following skills:

* Communication
* Interpersonal
* Critical thinking
* Problem solving
* Logical thinking
* Report writing
* Organizational

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Elements and their properties
* The particulate nature of matter
* Isotopes
* Atoms
* The periodic table
* Transition elements
* Minerals and Ores
* Nuclear chemistry
* Organic compounds
* Distribution of organic compounds
* Geochemical properties of organic compounds
* Organic minerals
* Phase equilibrium of elements
* Acids and bases
* Reduction and Oxidation reactions
* Aqueous chemistry

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency
 | Assessment requires evidence that the candidate: 1.1 Demonstrated understanding of:* The periodic table
* Elements and their properties
* The particulate nature of matter
* Isotopes
* Atoms
* Transition elements
* Minerals and Ores
* Nuclear chemistry
* Organic compounds
* Distribution of organic compounds
* Geochemical properties of organic compounds
* Organic minerals
* Phase equilibrium of elements
* Acids and bases
* Reduction and Oxidation reactions
* Aqueous chemistry

1.2 Demonstrated ability to:* Prepare solutions
* Standardize solutions
* Electroplate materials
* Prepare crystals
* Separate chemicals
* Identify organic compounds and minerals
* Prepare Organic compounds
* Liquefy gases
* Perform fractional distillation
* Perform titration
* Analyze chemical reactions
* Identify ionic and covalent bond
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Access to relevant workplace or appropriately simulated environment where assessment can take place

2.2 Laboratory 2.3 Relevant reagents 2.4 Relevant apparatus |
| 1. Methods of Assessment
 | Competency may be assessed through:1. Oral questioning
2. Interview
3. Observation
4. Written tests
5. Third party report
 |
| 1. Context of Assessment
 | Competency may be assessed:1. On-the- job
2. Off-the-job
3. Workplace experience
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# APPLY PHYSICS PRINCIPLES

**UNIT CODE: EXT/OS/GPE/CC/03/5/A**

**UNIT DESCRIPTION**

This unit describes the competencies required apply a wide range of physics principles in geophysical exploration. It involves applying principles of: the concept of basic quantities of measurement, mechanics, thermodynamics, optics, electricity and basic electronics.

This standard applies in the Extractives sector

**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 the concept of basic quantities of measurement
 | * 1. ***Phases of matter*** are explored as per kinetic theory.
	2. ***Dimensions of space*** are explored as per coordinate system.
	3. Concept of time is explored in relation to matter and space.
	4. Nature and ***properties of matter*** are explored in relation to applied stress.
	5. ***Parameters of measurement*** are measured, recorded and interpreted.
 |
| 1. Apply principles of mechanics
 | * 1. ***Forces*** are explored based on principles of vectors
	2. Statics and Kinematics are explored based on laws of motion.
	3. Velocity ratio, mechanical advantage and efficiency of machines are determined based on type of machine.
	4. Acoustics and waves are explored based on propagation modes.
 |
| 1. Apply principles of thermodynamics
 | * 1. ***Temperature scales*** are explored based on physical properties.
	2. ***Modes of heat transfer*** are explored based on mechanism.
	3. Thermodynamic work is explored as per laws of thermodynamics.
 |
| 1. Apply principles of optics
 | * 1. Production and nature of light is explored based on principles of quantum optics.
	2. Light as a particle is explored according to laws of geometric optics.
	3. ***Wave aspects of light*** are explored according to laws of physical optics.
 |
| 1. Apply principles of electricity
 | 1. Principles of electrostatics are explored based on Coulomb’s laws.
2. Principles of magnetism based on the behaviour of magnetic fields
3. Electromagnetism is explored based on electromagnetic induction laws.
4. ***Sources of electromotive force*** (emf) are explored based on energy conversion mechanisms.
5. Concept of basic electric circuits and electrical quantities are explored based on principles of charge flow.
6. Direct Current (D.C.) transients are explored based on Ohm’s law and Kirchhoff’s rules.
7. ***Basic electrical appliances*** are explored based on construction and purpose.
 |
| 1. Apply principles of basic electronics
 | * 1. Semiconducting materials are explored based on the band theory.
	2. Types of conduction are explored based on doping principles.
	3. Assembling of electronic gadgets is explored based on biasing 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. Phases of matter may include but not limited to:
 | * + Solids
	+ Liquids
	+ Gases/vapour
 |
| 1. Dimensions of space limited to:
 | * + linear
	+ laminar
	+ bulk
 |
| 1. Properties of matter may include but not limited to:
 | * + Density
	+ Pressure
	+ Surface tension
	+ Strength of materials
 |
| 1. Forces are limited to:
 | * + Statics
	+ Dynamics
 |
| 1. Temperature scales are limited to:
 | * + Celsius
	+ Fahrenheit
	+ Kelvin
 |
| 1. Modes of heat transfer are limited to:
 | * + Radiation
	+ Convection
	+ conduction
 |
| 1. Wave aspects of light are limited to:
 | * + Refraction
	+ Superposition
	+ Interference
 |
| 1. Basic electrical appliances may include but not limited to:
 | * + Lighting
	+ Heating
	+ Motor effect
 |
| 1. Sources of electromotive force may include but not limited to:
 | * + Cell
	+ Generators
	+ Magnetic field
 |
| 1. Parameters of measurement may include but not limited to:
 | * + Temperature
	+ Mass
	+ Length
	+ Time
 |

**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 skills
* Interpretation
* Analytical
* Logical thinking
* Critical thinking
* Problem solving
* Use basic equipment and tools

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Laws, theorems and postulates of physics
* Phases of matter
* Dimensions of space
* Concept of time
* Nature and properties of matter
* Parameters of measurement
* Forces
* Statics and dynamics
* Principles of machines
* Acoustics and waves
* Temperature scales
* Modes of heat transfer
* Thermodynamic work
* Production and nature of light
* Light as a particle
* Wave aspects of light
* Principles of electrostatics
* Principles of magnetism
* Electromagnetism
* Electromagnetic induction laws
* Electromagnetic spectrum
* Sources of electromotive force
* Concept of basic electric circuits and electrical quantities
* Direct Current (D.C.) transients
* Basic electrical appliances
* Semiconducting materials
* Types of conductivity
* Construction of electronic gadgets

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate: 1.1 Demonstrated understanding of:* Laws, theorems and postulates of physics
* Phases of matter
* Dimensions of space
* Concept of time
* Nature and properties of matter
* Parameters of measurement
* Forces
* Statics and Kinematics
* Velocity ratio, mechanical advantage and efficiency of machines
* Acoustics and waves
* Temperature scales
* Modes of heat transfer
* Thermodynamic work
* Production and nature of light
* Light as a particle
* Wave aspects of light
* Absorption, transmission and polarization
* Principles of electrostatics
* Principles of magnetism
* Electromagnetism
* Modification of electromagnetic induction laws
* Electromagnetic waves
* Sources of electromotive force
* Concept of basic electric circuits and electrical quantities
* Direct Current (D.C.) transients
* Principles of Alternating Current (A.C) circuits
* Basic electrical appliances
* Semiconducting materials
* Types of semiconductor conduction
* Assembling of electronic gadgets

1.2 Demonstrated ability to: * measure and calculate dimensions of space
* measure and calculate forces
* determine velocity
* measure and calculate acoustic frequencies
* measure and calculate time
* determine rates of heat transfer
* measure and calculate electrostatic force
* construct basic electric circuits
* construct basic electronic circuits
 |
| 1. Resource Implications
 | The following resources should be provided: * 1. Access to relevant workplace or appropriately simulated environment where assessment can take place
	2. Measuring tools and equipment
	3. Sample materials to be tested
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: * 1. Observation
	2. Interview
	3. Oral Questioning
	4. Written tests
	5. Third party report
 |
| 1. 4. Context of Assessment
 | Competency may be assessed: 1. On-the-job
2. Off-the-job
3. Workplace experience
 |
| 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

# STUDY AREA GEOLOGY

**UNIT CODE: EXT/OS/GPE/CR/01/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to survey area geology. It involves locating geological survey area, conducting area geological survey, conducting area petrological study, collect geological sample and preserve geological samples.

This standard applies in the Extractives sector.

**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. Locate geological survey area
 | 1. ***GIS, remote sensing tools and*** geological survey tools are identified and used as per manufacturer’s instructions.
2. ***PPEs*** are identified and used as per users’ manual.
3. Reconnaissance survey is conducted based on desk top survey findings.
 |
| 1. Conduct area geological survey
 | 1. ***GIS, remote sensing tools and*** geological survey tools are identified and used as per manufacturer’s instructions.
	1. ***Rock units*** are identified based on field observation and measurements.
	2. ***Physical features*** and vegetation are identified based on observation.
	3. ***Geological structures*** are identified and studied based on their formation.
	4. Spatial data on geological structures is collected and preserved based on nature and purpose.
 |
| 1. Conduct Petrological study
 | 1. Petrological tools and equipment are identified and used as per manufacturer’s instructions.
2. ***In-situ rock samples*** are identified, collected and studied based on formation and composition.
 |
| 1. Collect geological samples
 | 1. Geological samples ***identification*** and ***collection tools*** are identified based on job requirements.
2. ***Geological samples*** are identified and collected based on their in-situ condition.
3. Geological samples identification and collection tools are used as per manufacturer’s manual.
 |
| 1. Preserve geological samples
 | 1. ***Geological samples preservation tools*** are identified based on nature and type of sample.
2. Geological samples are prepared based on nature and type of sample.
3. Geological samples are preserved and transported based on nature and type of sample.
 |

**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. Geological survey tools may include but not limited to:
 | * GPS
* Compass
* Hand lens
* Geological hammer
* Clinometers
* Stationery
* Hardness kit
* Magnetic pencil
* Camera
 |
| 1. In-situ rock samples may include but not limited to:
 | * Igneous rocks
* Granite
* Trachyte
* Phonolite
* Metamorphic rocks
* Gneiss
* Schist
* Quartzite
* Sedimentary rocks
* Shale
* Sandstone
* Marl
 |
| 1. GIS and remote sensing

tools may include but not limited to: | * GPS
* GIS software
* Remote sensing software
 |
| 1. Reservoir parameters may include but not limited to:
 | * Permeability
* Porosity
* Pressure
 |
| 1. Geological structures may include but not limited to:
 | * Folds
* Faults
* Mylonites
* Bedding Planes
* Loadcasts
* Mudcracks
* Foliation
* Lineation
* Boudinage
* Intrusions
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jack
* Helmet
* Overall
* Goggles
 |
| 1. Physical features may include but not limited to:
 | * Rivers
* Valleys
* Hills
* Lakes
* Oceans
* Springs
 |
| Geological samplesbut not limited to: | * Rock cuttings
* Drill logs
* Fluid samples
 |
| Geological samples identification tools but not limited to: | * Hand lens
* Reagents
* Magnetic pen
 |
| Geological samples collection tools but not limited to: | * Sample bags
* Sample battles
* Geological hammers
* Fluid sample collectors
 |
| Geological samples preservation tools but not limited to: | * Air tight containers
* Boxes
 |

**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
* Time management
* Stress management
* Analytical
* Creative thinking
* Problem solving
* Negotiation
* Report writing
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Heath Safety and Environment
* Geological tools
* Equipment trouble shooting
* Map reading and interpretation
* GPS operation
* Remote sensing
* GIS
* Geological mapping
* Navigation
* Structural geology
* Petrography
* Reservoir geology

**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 desk top survey adequately.
2. Identified and used geological survey tools correctly.
3. Identified GIS and remote sensing survey tools correctly
4. Identified and used PPEs appropriately.
5. Conducted reconnaissance survey adequately.
6. Prepared satisfactory reconnaissance report.
7. Identified rock units and structures correctly.
8. Identified drill site correctly.
9. Identified mineral resource occurrence appropriately
10. Identified physical features and vegetation sufficiently.
11. Determined ground fluids properties and flows appropriately
12. Prepared a comprehensive geological area survey report adequately.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 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. |

# SURVEY AREA GRAVITY

**UNIT CODE: EXT/OS/GPE/CR/02/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to survey area gravity. It involves locating gravity survey area, recording gravity survey data, handling, mounting and dismounting gravity survey equipment.

This standard applies in the extractives sector.

**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. Locate gravity survey area
 | 1. ***PPEs*** are identified and used as per users’ manual.
2. Reconnaissance survey is conducted based on desk top survey findings.
 |
| 1. Record gravity survey points
 | 1. ***Gravity survey tools*** are identified and used as per manufacturer’s instruction.
2. Sub-surface rock density variation is measured based on gravimeter reading.
3. ***Sub-surface geological structures’*** density variation is measured based on gravimeter reading.
4. ***Sub-surface man made structures’*** density variation is measured based on gravimeter reading.
 |
| 1. Handle gravity survey equipment
 | 1. Gravity survey equipment is handled as per manufacturer’s instruction.
2. Gravity survey equipment is calibrated as per user’s manual
3. Gravity survey equipment is used as per user’s manual
4. Gravity survey equipment is maintained as per user’s manual
 |
| 1. Mount and dismount gravity survey equipment
 | 1. ***Preparation of gravity survey points*** is done as per terrain condition and equipment specification
2. Gravity survey equipment is mounted on the prepared survey point as per the manufacturer’s instructions.
3. Gravity survey equipment is dismounted from the survey point as per the manufacturer’s instructions
 |

**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. Gravity survey tools may include but not limited to:
 | * Gravimeter
* GPS
* Data sheets
* Differential GPS
 |
| 1. Sub-surface geological structures’ may include but not limited to:
 | * Faults
* Folds
* Syncline
* Joints
* Bedding planes
* Contact zones
* Caves
 |
| 1. Sub-surface man made structures’ may include but not limited to:
 | * Sub-ways
* Power lines
* Telecommunication lines
* Pipe lines
* Bunkers
* Water pipes
* Water tunnels
 |
| 1. Preparation of gravity survey points may include but not limited to:
 | * Bush clearing
* Ground levelling at sampling points
* Ground reinforcement at sampling points
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jacket
* Helmet
* Overall
* Ear buds
* Goggles
* Dust coat
 |

**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
* Time management
* Stress management
* Analytical
* Creative thinking
* Problem solving
* Negotiation
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Gravity theory
* Density of materials
* Gravimeter calibration
* Gravimeter mounting
* Gravimeter operations
* Gravimeter trouble shooting
* Map reading and interpretation
* Differential GPS operation

**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 PPEs correctly.
2. Conducted Reconnaissance survey satisfactorily.
3. Identified Gravity survey tools correctly.
4. Handled gravity survey equipment correctly.
5. Prepared ground at sampling points correctly.
6. Calibrated gravity survey equipment correctly.
7. Measured sub-surface rock density variation appropriately.
8. Measured sub-surface geological structures’ density variation correctly.
9. Measured sub-surface man made structures’ density variation appropriately.
10. Mounted and dismounted gravity survey equipment correctly.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the-job
3. Workplace experience
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# SURVEY AREA MAGNETISM

**UNIT CODE: EXT/OS/GPE/CR/03/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to survey area magnetism. It involves locating magnetic survey area, recording magnetic survey points, handling, mounting and dismounting magnetic survey equipment.

This standard applies in the extractives sector.

**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. Locate magnetic survey area
 | 1. ***PPEs*** are identified and used as per users’ manual.
2. Reconnaissance survey is conducted based on desk top survey findings.
 |
| 1. Survey magnetic properties
 | 1. ***Magnetic survey tools*** are identified based on job requirements.
2. Magnetic survey tools are used as per manufacturer’s instruction.
3. Sub-surface rock magnetic properties are measured based on magnetometer reading.
4. ***Sub-surface geological structures’*** magnetism is measured based on magnetometer reading.
5. ***Sub-surface man made structures’*** magnetism is measured based on magnetometer reading.
 |
| 1. Handle magnetic survey equipment
 | 1. Magnetic survey equipment is handled as per manufacturer’s instruction.
2. Magnetic survey equipment is calibrated as per user’s manual
3. Magnetic survey equipment is used as per user’s manual
4. Magnetic survey equipment is maintained as per user’s manual
 |
| 1. Mount and dismount gravity survey equipment
 | 1. Magnetic survey equipment is mounted as per the manufacturer’s instructions.
2. Magnetic survey equipment is dismounted as per the manufacturer’s instructions
 |

**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. Magnetic survey tools may include but not limited to:
 | * Magnetometer
* GPS
* Data sheets
* Differential GPS
 |
| 1. Sub-surface geological structures’ may include but not limited to:
 | * Faults
* Folds
* Syncline
* Joints
* Bedding planes
* Contact zones
* Caves
 |
| 1. Sub-surface man made structures’ may include but not limited to:
 | * Sub-ways
* Power lines
* Telecommunication lines
* Pipe lines
* Bunkers
* Water pipes
* Water tunnels
* Well casings
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jacket
* Helmet
* Overall
* Ear buds
* Goggles
* Dust coat
 |

**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
* Time management
* Stress management
* Analytical
* Creative thinking
* Problem solving
* Negotiation
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Magnetic principles
* magnetism of materials
* magnetometer calibration
* magnetometer mounting
* magnetometer operations
* magnetometer trouble shooting
* Map reading and interpretation
* Differential GPS operation

**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 PPEs correctly.
2. Conducted Reconnaissance survey satisfactorily.
3. Handled magnetic survey equipment appropriately.
4. Calibrated magnetic survey equipment correctly.
5. Measured sub-surface rock magnetic variation appropriately.
6. Measured sub-surface geological structures’ magnetic variation correctly.
7. Measured sub-surface man made structures’ magnetic variation appropriately.
8. Mounted and dismounted magnetic equipment appropriately.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the-job
3. Workplace experience
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# SURVEY AREA SEISMICITY

**UNIT CODE: EXT/OS/GPE/CR/04/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to survey area seismicity. It involves locating seismic survey area, recording seismic survey data, handling, mounting and dismounting seismic survey equipment.

This standard applies in the extractives sector.

**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. Locate seismic survey area
 | 1. ***PPEs*** are identified and used as per users’ manual.
2. Reconnaissance survey is conducted based on desk top survey findings
 |
| 1. Recording seismic data
 | 1. ***Seismic survey tools*** are identified based on ***job requirements***.
2. Seismic survey tools are used as per manufacturer’s instruction.
3. Seismic elastic properties are measured based on seismometer reading.
4. ***Sub-surface geological structures’*** seismic elasticity is measured based on seismometer reading.
5. ***Sub-surface man made structures’*** seismic is measured based on seismometer reading.
 |
| 1. Handling seismic survey tools
 | 1. Seismic survey equipment is handled as per manufacturer’s instruction.
2. Seismic survey equipment is calibrated as per user’s manual
3. Seismic survey equipment is used as per user’s manual
4. Seismic survey equipment is maintained as per user’s manual
 |
| 1. Mounting and dismounting seismic equipment
 | 1. ***Preparation of seismic survey points*** is done as per terrain condition and equipment specification
2. Seismic survey equipment is mounted as per the manufacturer’s instructions.
3. Seismic survey equipment is dismounted as per the manufacturer’s instructions.
 |

**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. Seismic survey tools may include but not limited to:
 | * Seismometer
* GPS
* Data sheets
* Differential GPS
* GPR
 |
| 1. Seismic survey job requirements may include but not limited to:
 | * Exploration
* Ground movement
* Reservoir monitoring
* Geo-hazard monitoring
 |
| 1. Sub-surface geological structures’ may include but not limited to:
 | * Faults
* Folds
* Syncline
* Joints
* Bedding planes
* Contact zones
* Caves
 |
| 1. Sub-surface man made structures’ may include but not limited to:
 | * Sub-ways
* Power lines
* Telecommunication lines
* Pipe lines
* Bunkers
* Water pipes
* Water tunnels
 |
| 1. Preparation of seismic survey tools may include but not limited to:
 | * Bush clearing
* Digging explosive holes
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jack
* Helmet
* Overall
* Ear buds
* Goggles
* Dust coat
 |

**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
* Time management
* Stress management
* Analytical
* Creative thinking
* Problem solving
* Negotiation
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Seismic principles
* Elasticity of materials
* Seismometer calibration
* Seismometer mounting
* Seismometer operations
* Seismometer trouble shooting
* Map reading and interpretation
* GPS operations

**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 PPEs correctly.
2. Conducted Reconnaissance survey satisfactorily.
3. Identified Seismic survey tools correctly.
4. Handled seismic survey equipment correctly.
5. Calibrated seismic survey equipment correctly.
6. Measured sub-surface rock seismic elasticity appropriately.
7. Measured sub-surface geological structures’ seismic elasticity correctly.
8. Measured sub-surface man made structures’ seismic elasticity appropriately
9. Identified passive geo-hazards monitoring tools appropriately.
10. Used passive geo-hazards monitoring tools properly.
11. Mounted and dismounted seismic survey equipment appropriately.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the-job
3. Workplace
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# SURVEY AREA RESISTIVITY

**UNIT CODE: EXT/OS/GPE/CR/05/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to survey area resistivity. It involves locating resistivity survey area, recording resistivity survey data, handling, mounting and dismounting resistivity survey equipment.

This standard applies in the extractives sector.

**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. Locate resistivity survey area
 | 1. ***PPEs*** are identified and used as per users’ manual.
2. Reconnaissance survey is conducted based on desk top survey findings.
 |
| 1. Record resistivity survey data
 | 1. ***Resistivity survey tools*** are identified based on job requirements.
2. Resistivity survey tools are handled as per user’s manual.
3. Resistivity survey equipment is calibrated as per manufacturer’s instruction.
4. Resistivity survey tools are used as per manufacturer’s instruction.
5. Resistivity properties are measured based on equipment readings.
6. ***Sub-surface geological structures’*** resistivity is measured based on equipment readings.
7. ***Sub-surface man made structures’*** resistivity is measured based on equipment reading.
8. Resistivity survey equipment is mounted and dismounted based on job requirement.
 |
| 1. Handle resistivity survey equipment
 | 1. Resistivity survey equipment is handled as per manufacturer’s instruction.
2. Resistivity survey equipment is calibrated as per user’s manual
3. Resistivity survey equipment is used as per user’s manual.
4. Resistivity survey equipment is maintained as per user’s manual
 |
| 1. Mounting and dismounting resistivity equipment
 | 1. Preparation of resistivity survey profiles is done as per terrain condition and equipment specification
2. Resistivity survey equipment is mounted as per the manufacturer’s instructions.
3. Resistivity survey equipment is dismounted as per the manufacturer’s instructions.
 |

**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. resistivity survey tools may include but not limited to:
 | * Terra-meter
* Magnetotellurics (MT)
* Transient Electro Magnetic(TEM)
* GPS
* Data sheets
 |
| 1. Sub-surface geological structures’ may include but not limited to:
 | * Faults
* Folds
* Syncline
* Joints
* Bedding planes
* Contact zones
* Caves
 |
| 1. Sub-surface man made structures’ may include but not limited to:
 | * Sub-ways
* Power lines
* Telecommunication lines
* Pipe lines
* Bunkers
* Water pipes
* Water tunnels
* Well casings
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jacket
* Helmet
* Overall
* Ear buds
* Goggles
* Dust coat
 |

**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
* Time management
* Stress management
* Creative thinking
* Problem solving
* Negotiation
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Electrical principles
* Resistivity of materials
* Resistivity equipment calibration
* Resistivity equipment mounting
* Resistivity equipment operations
* Resistivity equipment trouble shooting
* Map reading and interpretation
* GPS operations
* Record keeping

**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 PPEs correctly.
2. Conducted Reconnaissance survey satisfactorily.
3. Identified resistivity survey tools correctly.
4. Handled gravity survey equipment correctly.
5. Measured sub-surface rock resistivity appropriately.
6. Measured sub-surface geological structures’ resistivity appropriately.
7. Measured sub-surface man made structures’ resistivity correctly.
8. Mounted and dismounted resistivity survey equipment appropriately.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the-job
3. Workplace experience
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

# CONDUCT GEOPHYSICAL WELL LOGGING

**UNIT CODE: EXT/OS/GPE/CR/06/5/A**

**UNIT DESCRIPTION**

This unit covers the competencies required to conduct geophysical well logging. It involves locating the well, preparing the well for logging, handling logging tools, logging the well, mounting and dismounting logging tools.

This standard applies in the extractives sector.

**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. Locate the well
 | 1. ***PPEs*** are identified and used as per users’ manual.
2. Well location information is obtained based on existing data.
3. ***Tools for well location*** are identified and used as per users’ manual.
4. Well location is defined based on site coordinates.
 |
| 1. Prepare the well for logging
 | 1. Physical condition of the well is evaluated based on observation.
2. Prepare access to the well based on terrain.
3. Well is prepared based on type of log.
 |
| 1. Handle geophysical well logging tools
 | 1. Geophysical well logging tools are handled as per manufacturer’s instruction.
2. Geophysical well logging tools are calibrated as per user’s manual
3. Geophysical well logging tools are used as per user’s manual.
4. Geophysical well logging tools are maintained as per user’s manual
 |
| 1. Log the well
 | 1. ***Logging tools*** are selected based on type of log.
2. Logging tools are set up based on type and users’ manual.
3. Logging process is conducted based on type of log.
 |
| 1. Mounting and dismounting geophysical well logging tools
 | 1. Geophysical well logging tools are mounted based on type of log and manufacturer’s instructions.
2. Geophysical well logging tools are dismounted as per the manufacturer’s instructions.
 |

**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. Logging tools may include but not limited to:
 | * Potentiometer
* Gamma logger tool
* Open Hole Caliper
* Acoustic log tool
* Pressure/Temperature Tools
* Data sheets
* Truck
 |
| 1. Well locating tools may include but not limited to:
 | * GPS
* Maps
 |
| 1. PPEs may include but not limited to:
 | * Exploration boots
* Snake boots
* Gloves
* Rain coat
* Hat
* Dust mask
* Reflective jacket
* Helmet
* Overall
* Ear buds
* Goggles
* Dust coat
 |

**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
* Time management
* Stress management
* Creative thinking
* Problem solving
* Negotiation
* Public relations
* ICT

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Electrical principles
* Radiation principle
* Thermal gradient
* Seismicity principles
* Properties of materials
* Logging equipment calibration
* Logging equipment mounting
* Logging equipment operations
* Logging equipment trouble shooting
* Map reading and interpretation
* GPS operations
* Record keeping

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of Competency
 | Assessment requires evidence that the candidate: 1. Obtained well location information accurately.
2. Identified tools for well location correctly.
3. Defined well location correctly.
4. Prepared access to the well appropriately.
5. Evaluated physical condition of the well accurately.
6. Prepared well appropriately.
7. Selected logging equipment appropriately.
8. Set up logging equipment appropriately.
9. Conducted logging process appropriately.
10. Mounted and dismounted logging equipment correctly.
 |
| 1. Resource Implications
 | The following resources should be provided: 1. Appropriately simulated environment where assessment can take place.
2. Access to relevant assessment environment.
3. Resources relevant to the proposed assessment activity or tasks.
 |
| 1. Methods of Assessment
 | Competency in this unit may be assessed through: 1. Oral questioning
2. Written tests
3. Interviews
4. Observation
5. Portfolio
6. Third party reports
 |
| 1. Context of Assessment
 | Competency may be assessed 1. On-the-job
2. Off-the-job
3. Workplace experience
 |
| 1. Guidance information for assessment
 | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |