



**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**ARCHITECTURAL TECHNICIAN**

**LEVEL 6**



**TVET CDACC**  
**P.O BOX 15745-00100**  
**NAIROBI**

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## **FOREWORD**

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement 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 in the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, Curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in Curriculum development to ensure the Curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for the purpose of developing a competency-based Curriculum for Architectural Technology Level 6. 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 Construction sector's growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING  
MINISTRY OF EDUCATION**

## **PREFACE**

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

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need 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 Construction Sector Skills Advisory Committee (SSAC) have developed these Occupational Standards for architectural technician. These standards will be the basis for development of competency-based Curriculum for Architectural Technology level 6.

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, Construction 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 efforts of various stakeholders from private and public organizations. I am thankful to the management of the 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 Construction Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

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

**CHAIRPERSON**

**CONSTRUCTION SECTOR SKILLS ADVISORY COMMITTEE**

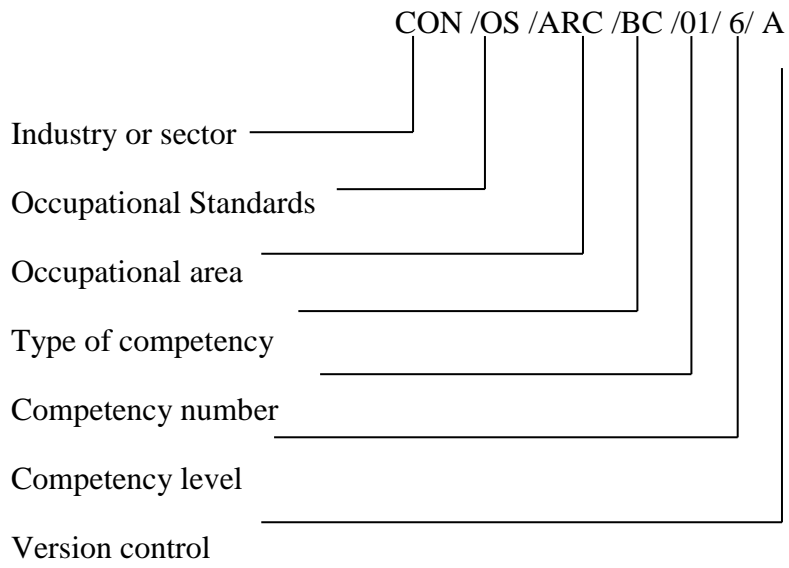
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## ABBREVIATIONS AND ACRONYMS

ARC	: Architecture
BC	: Basic competency
CC	: Common competency
CDACC	: Curriculum Development Assessment and Certification Council
CON	: Construction
CR	: Core competency
HVAC	: Heating Ventilation Air Conditioning
ICT	: Information Communication Technology
MoE	: Ministry of Education
NCA	: National Construction Authority
NEMA	: National Environmental 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
TVET	: Technical and Vocational Education and Training

## KEY TO UNIT CODE



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## OVERVIEW

This course consists of competencies required by an Architectural Technician to design and detail architectural projects, produce architectural perspectives, produce architectural models, cost architectural projects, landscape architectural projects, install building finishes and fittings, apply alternative building technology and manage construction site.

It consists of the following units of competencies:

### BASIC UNITS OF COMPETENCY

UNIT CODE	UNIT TITLE
CON/OS/ARC/BC/01/6/A	Demonstrate communication skills
CON/OS/ARC/BC/02/6/A	Demonstrate numeracy skills
CON/OS/ARC /BC/03/6/A	Demonstrate digital literacy
CON/OS/ARC /BC/04/6/A	Demonstrate entrepreneurial skills
CON/OS/ARC /BC/05/6/A	Demonstrate employability skills
CON/OS/ARC /BC/06/6/A	Demonstrate environmental literacy
CON/OS/ARC /BC/07/6/A	Demonstrate occupational safety and health practices

### COMMON UNITS OF COMPETENCY

UNIT CODE	UNIT TITLE
CON/OS/ARC/CC/01/6/A	Apply mathematical skills
CON/OS/ ARC /CC/02/6/A	Prepare and interpret technical drawings
CON/OS/ ARC /CC/03/6/A	Apply building materials science
CON/OS/ ARC /CC/04/6/A	Apply workshop technology practices
CON/OS/ ARC /CC/05/6/A	Apply principles of building technology and service
CON/OS/ ARC /CC/06/6/A	Apply history of architecture
CON/OS/ ARC /CC/07/6/A	Apply Principles of Structural Design

### CORE UNITS OF COMPETENCIES

UNIT CODE	UNIT TITLE
CON/OS/ ARC /CR /01/6/A	Design and detail architectural projects
CON/OS/ ARC /CR/02/6/A	Produce architectural perspectives
CON/OS/ ARC /CR/03/6/A	Produce architectural models
CON/OS/ ARC /CR/04/6/A	Cost architectural projects
CON/OS/ ARC /CR/05/6/A	Landscape architectural projects
CON/OS/ ARC /CR/06/6/A	Install building finishes and fittings
CON/OS/ ARC /CR/07/6/A	Apply alternative building technology
CON/OS/ ARC /CR/08/6/A	Manage construction site

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## **BASIC UNITS OF COMPETENCY**

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## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** CON/OS/ARC/BC/01/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
These describe the key outcomes which make up workplace function	These are assessable statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Meet communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met based on workplace requirements 1.2 Different communication approaches are identified and applied according to clients' needs 1.3 Conflict is identified and addressed as per the standards of the organization
2. Develop communication strategies	2.1 Strategies for effective internal and external dissemination of information are developed as per organization's requirements 2.2 Special communication needs are considered in developing strategies according workplace procedures 2.3 <i><b>Communication strategies</b></i> are analyzed, evaluated and revised based the workplace needs
3. Establish and maintain communication pathways	3.1 Pathways of communication are established as per organization policy 3.2 Pathways are maintained and reviewed according to organization procedures
4. Promote use of communication strategies	4.1 Information is provided to all areas of the organization as per strategy requirements 4.2 Effective communication techniques are articulated and modeled according work requirements 4.3 Personnel are given guidance about adapting communication strategies as per organization procedures

5. Conduct interview	<p>5.1 A range of appropriate communication strategies are employed in <i>interview situations</i> based on the workplace requirements</p> <p>5.2 Records of interviews are made and maintained in accordance with organizational procedures</p> <p>5.3 Effective questioning, listening and nonverbal communication techniques are used as per needs</p>
6. Facilitate group discussion	<p>6.1 Mechanisms to enhance <i>effective group interaction</i> are identified and implemented according to workplace requirements</p> <p>6.2 Strategies to encourage group participation are identified and used as per organizations' procedures</p> <p>6.3 Meetings objectives and agenda are set and followed based on workplace requirements</p> <p>6.4 Relevant information is provided and feedback obtained according to set protocols</p> <p>6.5 Evaluation of group communication strategies is undertaken in accordance with workplace guidelines</p> <p>6.6 Specific communication needs of individuals are identified and addressed as per individual needs</p>
7. Represent the organization	<p>5.1 Relevant presentation are researched and presented based on internal or external communication forums requirements</p> <p>5.2 Presentation is delivered in a clear and sequential manner as per the predetermined time</p> <p>5.3 Presentation is made as per appropriate media</p> <p>5.4 Difference views are respected based on workplace procedures</p> <p>5.5 Written communication is done as per organizational standards</p> <p>5.6 Inquiries are responded according to organizational standard</p>

### **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.

<b>Variable</b>	<b>Range</b>
<p><i>I.</i> Communication strategies may include but not limited to:</p>	<ul style="list-style-type: none"> <li>● Language switch</li> <li>● Comprehension check</li> <li>● Repetition</li> <li>● Asking confirmation</li> </ul>

	<ul style="list-style-type: none"> <li>• Paraphrase</li> <li>• Clarification request</li> <li>• Translation</li> <li>• Restructuring</li> <li>• Approximation</li> <li>• Generalization</li> </ul>
2. Effective group interaction may include but not limited to:	<ul style="list-style-type: none"> <li>• Identifying and evaluating what is occurring within an interaction in a nonjudgmental way</li> <li>• Using active listening</li> <li>• Making decision about appropriate words, behavior</li> <li>• Putting together response which is culturally appropriate</li> <li>• Expressing an individual perspective</li> <li>• Expressing own philosophy, ideology and background and exploring impact with relevance to communication</li> </ul>
3. Situations may include but not limited to:	<ul style="list-style-type: none"> <li>• Establishing rapport</li> <li>• Eliciting facts and information</li> <li>• Facilitating resolution of issues</li> <li>• Developing action plans</li> <li>• Diffusing potentially difficult situations</li> </ul>

## **REQUIRED SKILLS AND KNOWLEDGE**

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

### **Required Skills**

The individual needs to demonstrate the following skills:

- Communication
- Active listening
- Interpretation
- Negotiation
- Writing

### **Required Knowledge**

The individual needs to demonstrate knowledge of:

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

## EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Developed communication strategies to meet the organization requirements and applied in the workplace 1.2 Established and maintained communication pathways for effective communication in the workplace 1.3 Used communication strategies involving exchanges of complex oral information
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct observation 3.2 Oral questioning 3.3 Written texts
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. 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:** CON/OS/ARC/BC/02/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <b><i>Bold and italicized terms are elaborated in the Range.</i></b>
1. Apply a wide range of mathematical calculations for work	1.1 Mathematical information embedded in a range of workplace tasks and texts is extracted as per workplace procedures. 1.2 Mathematical information is interpreted and comprehended as per job specifications 1.3 A range of mathematical and problem solving processes are selected and used as per job specification 1.4 Different forms of fractions, decimals and percentages are flexibly used as per SOPs 1.5 Calculation performed with positive and negative numbers as per SOPs 1.6 Numbers are expressed as powers and roots and are used in calculations as per SOPs 1.7 Calculations done using routine formulas as per SOPs 1.8 Estimation and assessment processes are used to check outcome as per workplace procedures 1.9 Mathematical language is used to discuss and explain the processes, results and implications of the task as per workplace procedures
2. Use and apply ratios, rates and	2.1 Information regarding ratios, rates and proportions extracted from a range of workplace tasks and texts



<p>proportions for work</p>	<p>as per SOPs</p> <p>2.2 Mathematical information related to ratios, rate and proportions is analysed as per SOPs</p> <p>2.3 Problem solving processes are used to undertake the task as per workplace procedures</p> <p>2.4 Equivalent ratios and rates are simplified as per SOPs</p> <p>2.5 Quantities are calculated using ratios, rates and proportions as per SOPs</p> <p>2.6 Graphs, charts or tables are constructed to represent ratios, rates and proportions as per SOPs</p> <p>2.7 The outcomes reviewed and checked as per job specifications</p> <p>2.8 Information is record using mathematical language and symbols as per workplace procedures</p>
<p>3. Estimate, measure and calculate measurement for work</p>	<p>3.1 Measurement information embedded in workplace texts and tasks are extracted and interpreted as per job specifications</p> <p>3.2 Appropriate workplace measuring equipment are identified and selected as per job specifications</p> <p>3.3 Accurate measurements are estimated and made as per SOPs</p> <p>3.4 The area of <b>2D shapes</b> including compound shapes are calculated as per SOPs</p> <p>3.5 The volume of 3D shapes is calculated using relevant formulas as per SOPs</p> <p>3.6 Sides of right angled triangles are calculated using Pythagoras' theorem as per SOPs</p> <p>3.7 conversions are perform between units of measurement as per job specification</p> <p>3.8 Problem solving processes are used to undertake the task as per workplace Procedures</p> <p>3.9 The measurement outcomes are reviewed and checked as per workplace procedures</p> <p>3.10 Information is recorded using mathematical language and symbols appropriate for the task as per workplace procedures</p>
<p>4. Use detailed maps to plan travel routes for work</p>	<p>4.1 Different types of maps are identified and interpreted as per job requirements</p> <p>4.2 Key features of maps are identified as per job requirements</p>

	<p>4.3 Scales are identified and interpreted as per job requirements</p> <p>4.4 Scales are applied to calculate actual distances</p> <p>4.5 Positions or locations are determined using directional information as per job requirements</p> <p>4.6 Routes are planned by determining directions and calculating distances, speeds and times as per job requirements</p> <p>4.7 Information is gathered and identified and relevant factors related to planning a route checked as per job requirements</p> <p>4.8 Relevant equipment is select and checked for accuracy and operational effectiveness as per job requirements</p> <p>4.9 Task is planned and recorded using specialized mathematical language and symbols appropriate for the task as per job requirements</p>
<p>5. Use geometry to draw 2D shapes and construct 3D shapes for work</p>	<p>5.1 A range of 2D shapes and 3D shapes and their uses in work contexts is identified as per job specifications</p> <p>5.2 Features of 2D and 3D shapes are named and described as per job specifications</p> <p>5.3 Types of angles in 2D and 3D shapes are identified as per job specifications</p> <p>5.4 Angles are drawn, estimated and measured using geometric instruments as per job requirements</p> <p>5.5 Angle properties of 2D shapes are named and identified as per SOPs</p> <p>5.6 Angle properties are used to evaluate unknown angles in shapes as per SOPs</p> <p>5.7 Properties of perpendicular and parallel lines are applied to shapes as per SOPs</p> <p>5.8 Understanding and use of symmetry is demonstrated as per SOPs</p> <p>5.9 Understanding and use of similarity is demonstrated as per SOPs</p> <p>5.10 The workplace tasks and mathematical processes required are identified as per workplace procedures</p> <p>5.11 2D shapes is drawn for work as per job specification</p> <p>5.12 3D shapes is constructed for work as per job</p>

	<p>specification</p> <p>5.13 The outcomes are reviewed and checked as per workplace procedures</p> <p>5.14 Specialized mathematical language and symbols appropriate for the task are used as per SOPs</p>
<p>6. Collect, organize, and interpret statistical data for work</p>	<p>6.1 Workplace issue requiring investigation are identified as per workplace procedures</p> <p>6.2 Audience / population / sample unit is determined as per workplace procedures as per workplace procedures</p> <p>6.3 Data to be collected is identified as per workplace procedures</p> <p>6.4 Data collection method is selected as per workplace procedures</p> <p>6.5 Appropriate statistical data is collected and organized as per SOPs</p> <p>6.6 Data is illustrated in appropriate formats as per SOPs</p> <p>6.7 The effectiveness of different types of graphs are compared as per SOPs</p> <p>6.8 The summary statistics for collected data is calculated as per SOPs</p> <p>6.9 The results / findings are interpreted as per SOPs</p> <p>6.10 Data is checked to ensure that it meets the expected results and content as per workplace procedures</p> <p>6.11 Information from the results including tables, graphs and summary statistics is extracted and interpreted as per workplace procedure</p> <p>6.12 Mathematical language and symbols are used to report results of investigation as per workplace procedure</p>
<p>7. Use routine formula and algebraic expressions for work</p>	<p>7.1 Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated as per SOPs</p> <p>7.2 Simple algebraic expressions and equations are developed as per job specification</p> <p>7.3 Operate on algebraic expressions as per job requirement</p> <p>7.4 Algebraic expressions are simplified as per job requirement</p> <p>7.5 Substitution into simple routine equations is done as</p>

	<p>per SOPs</p> <p>7.6 Routine formulas used for work tasks are identified and comprehended as per SOPs</p> <p>7.7 Routine formulas are evaluate by substitution as per SOPs</p> <p>7.8 Routine formulas transposed as per SOPs</p> <p>7.9 Appropriate formulas are identified and used for work related tasks as per workplace procedures</p> <p>7.10 Outcomes are checked and result of calculation used as per workplace procedures</p>
8. Use common functions of a scientific calculator for work	<p>8.1 Required numerical information to perform tasks is located as per job specification</p> <p>8.2 The order of operations and function keys necessary to solve mathematical calculation are determined as per job specification</p> <p>8.3 Function keys on a scientific calculator are identified and used as per SOPs</p> <p>8.4 Estimations are referred to check reasonableness of problem solving process as per workplace procedures</p> <p>8.5 Appropriate mathematical language, symbols and conventions are used to report results as per workplace procedures</p>

## RANGE

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

Variable	Range
1. 2D shapes may include but not limited may include but not limited to:	<ul style="list-style-type: none"> <li>• Triangles</li> <li>• Square</li> <li>• Rectangle</li> <li>• Triangle</li> </ul>

## 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	<p>Assessment requires evidence that the candidate:</p> <p>1. 1 Developed communication strategies to meet the organization requirements and applied in the workplace</p> <p>1. 2 Established and maintained communication pathways for effective communication in the workplace</p> <p>1. 3 Used communication strategies involving exchanges of complex oral information</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take</p>

	place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed: 4.1 On-the-job 4.2 Off-the –job 4.3 During Industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## DEMONSTRATE DIGITAL LITERACY

**UNIT CODE:** CON/OS/ARC/BC/03/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function	These are assessable statements which specify the required level of performance for each of the elements.  <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Identify appropriate computer software and hardware	1.1 Concepts of ICT are determined in accordance with computer equipment 1.2 Classifications of computers are determined in accordance with manufacturers specification 1.3 Appropriate computer software is identified according to manufacturer's specification 1.4 Appropriate computer hardware is identified according to manufacturer's specification 1.5 Functions and commands of operating system are determined in accordance with manufacturer's specification
2. Apply security measures to data, hardware, software in automated environment	2.1 <i><b>Data security and privacy are classified</b></i> in accordance with the prevailing technology 2.2 <i><b>Security threats</b></i> reidentified <i><b>and control measures</b></i> are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected in accordance to Information Management security guidelines 2.4 Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
3. Apply computer software in	3.1 <i><b>Word processing concepts</b></i> are applied in resolving workplace tasks, report writing and documentation as per the job requirements

solving tasks	<p>3.2 <b>Word processing utilities</b> are applied in accordance with workplace procedures</p> <p>3.3 Worksheet layout is prepared in accordance with work procedures</p> <p>3.4 Worksheet is built and data manipulated in the worksheet in accordance with workplace procedures</p> <p>3.5 Continuous data manipulated on worksheet is undertaken in accordance with work requirements</p> <p>3.6 Database design and manipulation is undertaken in accordance with office procedures</p> <p>3.7 Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures</p>
4. Apply internet and email in communication at workplace	<p>4.1 Electronic mail addresses are opened and applied in workplace communication in accordance with office policy</p> <p>4.2 Office internet functions are defined and executed in accordance with office procedures</p> <p>4.3 <b>Network configuration</b> is determined in accordance with office operations procedures</p> <p>4.4 Official World Wide Web is installed and managed according to workplace procedures</p>
5. Apply Desktop publishing in official assignments	<p>5.1 Desktop publishing functions and tools are identified in accordance with manufactures specifications</p> <p>5.2 Desktop publishing tools are developed in accordance with work requirements</p> <p>5.3 Desktop publishing tools are applied in accordance with workplace requirements</p> <p>5.4 Typeset work is enhanced in accordance with workplace standards</p>
6. Prepare presentation packages	<p>6.1 Types of presentation packages are identified in accordance with office requirements</p> <p>6.2 Slides are created and formulated in accordance with workplace procedures</p> <p>6.3 Slides are edited and run-in accordance with work procedures</p> <p>6.4 Slides and handouts are printed according to work requirements</p>

### **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.



<b>Variable</b>	<b>Range</b>
1. Appropriate computer hardware may include but not limited to:	Collection of physical parts of a computer system such as: <ul style="list-style-type: none"> <li>• Computer case, monitor, keyboard, and mouse</li> <li>• All the parts inside the computer case, such as the hard disk drive, motherboard and video card</li> </ul>
2. Data security and privacy may include but not limited to:	<ul style="list-style-type: none"> <li>• Confidentiality of data</li> <li>• Cloud computing</li> <li>• Integrity -but-curious data surfing</li> </ul>
3. Security and control measures may include but not limited to:	<ul style="list-style-type: none"> <li>• Counter measures against cyber terrorism</li> <li>• Risk reduction</li> <li>• Cyber threat issues</li> <li>• Risk management</li> <li>• Pass-wording</li> </ul>
4. Security threats may include but not limited to:	<ul style="list-style-type: none"> <li>• Cyber terrorism</li> <li>• Hacking</li> </ul>

## **REQUIRED SKILLS AND KNOWLEDGE**

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

### **Required Skills**

The individual needs to demonstrate the following skills:

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

### **Required Knowledge**

The individual needs to demonstrate knowledge of:

- Software concept
- Functions of computer software and hardware
- Data security and privacy

- Computer security threats and control measures
- Technology underlying cyber-attacks and networks
- Cyber terrorism
- Computer crimes
- Detection and protection of computer crimes
- Laws governing protection of ICT
- Word processing;
  - ✓ Functions and concepts of word processing.
  - ✓ Documents and tables creation and manipulations
  - ✓ Mail merging
  - ✓ Word processing utilities
- Spread sheets;
  - ✓ Meaning, formulae, function and charts, uses and layout
  - ✓ Data formulation, manipulation and application to cells
  - ✓
- Database;
  - ✓ Database design, data manipulation, sorting, indexing, storage retrieval and security
- Desktop publishing;
  - ✓ Designing and developing desktop publishing tools
  - ✓ Manipulation of desktop publishing tools
  - ✓ Enhancement of typeset work and printing documents
- Presentation Packages;
  - ✓ Types of presentation Packages
  - ✓ Creating, formulating, running, editing, printing and presenting slides and handouts
- Networking and Internet;
  - ✓ Computer networking and internet.
  - ✓ Electronic mail and world wide web
- Emerging trends and issues in ICT;
  - ✓ Identify and integrate emerging trends and issues in ICT
  - ✓ Challenges posed by emerging trends and issues

## EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> <li>1.1 Identified and controlled security threats</li> <li>1.2 Detected and protected computer crimes</li> <li>1.3 Applied word processing in office tasks</li> <li>1.4 Designed, prepared work sheet and applied data to the</li> </ul>
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	<p>cells in accordance to workplace procedures</p> <p>1.5 Opened electronic mail for office communication as per workplace procedure</p> <p>1.6 Installed internet and World Wide Web for office tasks in accordance with office procedures</p> <p>1.7 Integrated emerging issues in computer ICT applications</p> <p>1.8 Applied laws governing protection of ICT</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace where assessment can take place</p> <p>2.2 Appropriately simulated environment where assessment can take place</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4. Context of Assessment	<p>Competency may be assessed:</p> <p>4.1 On-the-job</p> <p>4.2 Off-the –job</p> <p>4.3 During Industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

## DEMONSTRATE ENTREPRENEURIAL SKILLS

**UNIT CODE :** CON/OS/ARC/BC/04/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
<p>1. Demonstrate understanding of an Entrepreneur</p>	<p>1.1 Entrepreneurs and Business persons are distinguished as per principles of entrepreneurship</p> <p>1.2 <i>Types of entrepreneurs</i> are identified as per principles of entrepreneurship</p> <p>1.3 Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship</p> <p>1.4 <i>Characteristics of Entrepreneurs</i> are identified as per principles of Entrepreneurship</p> <p>1.5 Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship</p>
<p>2. Demonstrate understanding of Entrepreneurship and self-employment</p>	<p>2.1 Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship</p> <p>2.2 Importance of self-employment is analysed based on business procedures and strategies</p> <p>2.3 <i>Requirements for entry into self-employment</i></p>

	<p>are identified according to business procedures and strategies</p> <p>2.4 Role of an Entrepreneur in business is determined according to business procedures and strategies</p> <p>2.5 Contributions of Entrepreneurs to National development are identified as per business procedures and strategies</p> <p>2.6 Entrepreneurship culture in Kenya is explored as per business procedures and strategies</p> <p>2.7 Born or made Entrepreneurs are distinguished as per entrepreneurial traits</p>
<p>3. Identify Entrepreneurship opportunities</p>	<p>3.1 Sources of business ideas are identified as per business procedures and strategies</p> <p>3.2 Business ideas and opportunities are generated as per business procedures and strategies</p> <p>3.3 Business life cycle is analysed as per business procedures and strategies</p> <p>3.4 Legal aspects of business are identified as per procedures and strategies</p> <p>3.5 Product demand is assessed as per market strategies</p> <p>3.6 Types of <i>business environment</i> are identified and evaluated as per business procedures</p> <p>3.7 Factors to consider when evaluating business environment are explored based on business procedure and strategies</p> <p>3.8 Technology</p>

	in business is incorporated as per best practice
4. Create entrepreneurial awareness	<p>4.1 <b>Forms of businesses</b> are explored as per business procedures and strategies</p> <p>4.2 Sources of business finance are identified as per business procedures and strategies</p> <p>4.3 Factors in selecting source of business finance are identified as per business procedures and strategies</p> <p>4.4 <b>Governing policies</b> on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies</p> <p>4.5 Problems of starting and operating SSEs are explored as per business procedures and strategies</p>
5. Apply entrepreneurial motivation	<p>5.1 <b>Internal and external motivation</b> factors are determined in accordance with motivational theories</p> <p>5.2 Self-assessment is carried out as per entrepreneurial orientation</p> <p>5.3 Effective communications are carried out in accordance with communication principles</p> <p>5.4 Entrepreneurial motivation is applied as per motivational theories</p>
6. Develop innovative business strategies	<p>6.1 Business innovation strategies are determined in accordance with the organization strategies</p> <p>6.2 Creativity in business development is demonstrated in accordance with business strategies</p> <p>6.3 <b>Innovative business strategies</b> are developed as per business principles</p>

	<p>6.4 Linkages with other entrepreneurs are created as per best practice</p> <p>6.5 ICT is incorporated in business growth and development as per best practice</p>
7. Develop Business Plan	<p>7.1 Identified Business is described as per business procedures and strategies</p> <p>7.2 Marketing plan is developed as per business plan format</p> <p>7.3 Organizational/Management plan is prepared in accordance with business plan format</p> <p>7.4 Production/operation plan in accordance with business plan format</p> <p>7.5 Financial plan is prepared in accordance with the business plan format</p> <p>7.6 Executive summary is prepared in accordance with business plan format</p> <p>7.7 Business plan is presented as per best practice</p>

### **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.

<b>Variable</b>	<b>Range</b>
1. Types of entrepreneurs may include but not limited to:	<ul style="list-style-type: none"> <li>• Innovators</li> <li>• Imitators</li> <li>• Craft</li> </ul>

	<ul style="list-style-type: none"> <li>• Opportunistic</li> <li>• Speculators</li> </ul>
2. Characteristics of Entrepreneurs may include but not limited to:	<ul style="list-style-type: none"> <li>• Creative</li> <li>• Innovative</li> <li>• Planner</li> <li>• Risk taker</li> <li>• Networker</li> <li>• Confident</li> <li>• Flexible</li> <li>• Persistent</li> <li>• Patient</li> <li>• Independent</li> <li>• Future oriented</li> <li>• Goal oriented</li> </ul>
3. Requirements for entry into self-employment may include but not limited to	<ul style="list-style-type: none"> <li>• Technical skills</li> <li>• Management skills</li> <li>• Entrepreneurial skills</li> <li>• Resources</li> <li>• Infrastructure</li> </ul>
4. Internal and external motivation may include but not limited to:	<ul style="list-style-type: none"> <li>• Interest</li> <li>• Passion</li> <li>• Freedom</li> <li>• Prestige</li> <li>• Rewards</li> <li>• Punishment</li> <li>• Enabling environment</li> <li>• Government policies</li> </ul>
5. Business environment may include but not limited to:	<ul style="list-style-type: none"> <li>• External</li> <li>• Internal</li> <li>• Intermediate</li> </ul>



<p>6. Forms of businesses may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Sole proprietorship</li> <li>• Partnership</li> <li>• Limited companies</li> <li>• Cooperatives</li> </ul>
<p>7. Governing policies may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Increasing scope for finance</li> <li>• Promoting cooperation between entrepreneurs and private sector</li> <li>• Reducing regulatory burden on entrepreneurs</li> <li>• Developing IT tools for entrepreneurs</li> </ul>
<p>8. Innovative business strategies may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• New products</li> <li>• New methods of production</li> <li>• New markets</li> <li>• New sources of supplies</li> <li>• Change in industrialization</li> </ul>

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required Skills**

The individual needs to demonstrate the following skills:

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

#### **Required Knowledge**

The individual needs to demonstrate knowledge of:

- Decision making

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

### **EVIDENCE GUIDE**

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

1. Critical Aspects of Competency	1. 1	Assessment requires evidence that the candidate:
	1. 2	Distinguished
	1. 3	entrepreneurs and businesspersons correctly
	1. 4	Identified ways of becoming an entrepreneur appropriately
	1. 5	Explored factors affecting entrepreneurship development appropriately
	1. 6	Analysed importance of self-employment accurately
		Identified requirements for entry into self-employment correctly

	<p>1. 7 Identified sources of business ideas correctly</p> <p>1. 8 Generated Business ideas and opportunities correctly</p> <p>1. 9 Analysed business life cycle accurately</p> <p>1. 10 Identified legal aspects of business correctly</p> <p>1. 11 Assessed product demand accurately</p> <p>1. 12 Determined Internal and external motivation factors appropriately</p> <p>1. 13 Carried out communications effectively</p> <p>1. 14 Identified sources of business finance correctly</p> <p>1. 15 Determined Governing policy on small scale enterprise appropriately</p> <p>1. 16 Explored problems of starting and operating SSEs effectively</p> <p>1. 17 Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly</p> <p>1. 18 Prepared executive summary correctly</p> <p>1. 19 Determined business innovative strategies appropriately</p> <p>1. 20 Presented business plan effectively</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace where assessment can take place</p> <p>2.2 Appropriately simulated environment where assessment can take place</p>
3. Methods of Assessment	<p>3.1 Written tests</p> <p>3.2 Oral questions</p> <p>3.3 Third party report</p> <p>3.4 Interviews</p> <p>3.5 Portfolio of Evidence</p>
4. Context of Assessment	<p>Competency may be assessed</p> <p>4.1 On-the-job</p> <p>4.2 Off-the –job</p> <p>4.3 During Industrial attachment</p>

5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.
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## DEMONSTRATE EMPLOYABILITY SKILLS

**UNIT CODE:** CON/OS/ARC/BC/05/6/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 a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
<p>These describe the key outcomes which make up workplace function.</p>	<p>These are assessable statements which specify the required level of performance for each of the elements.</p> <p><i><b>Bold and italicized terms are elaborated in the Range</b></i></p>
<p>1. Conduct self-management</p>	<p>1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives</p> <p>1.2 Emotional intelligence is demonstrated as per workplace requirements.</p> <p>1.3 Individual performance is evaluated and monitored according to the agreed targets.</p> <p>1.4 Assertiveness is developed and maintained based on the requirements of the job.</p> <p>1.5 Accountability and responsibility for own actions are demonstrated based on workplace instructions.</p> <p>1.6 Self-esteem and a positive self-image are developed and maintained based on values.</p> <p>1.7 Time management, attendance and punctuality are observed as per the organization policy.</p> <p>1.8 Goals are managed as per the organization's objective</p> <p>1.9 Self-strengths and weaknesses are identified based on personal objectives</p>
<p>2. Demonstrate interpersonal communication</p>	<p>2.1 Writing skills are demonstrated as per communication policy</p> <p>2.2 Negotiation and persuasion skills are demonstrated as per communication policy</p> <p>2.3 Internal and external stakeholders' needs are identified and interpreted as per the communication policy</p>

	<p>2.4 Communication networks are established based on workplace policy</p> <p>2.5 Information is shared as per communication policy</p>
3. Demonstrate critical safe work habits	<p>3.1 Stress is managed in accordance with workplace policy.</p> <p>3.2 Punctuality and time consciousness is demonstrated in line with workplace policy.</p> <p>3.3 Personal objectives are integrated with organization goals based on organization’s strategic plan.</p> <p>3.4 <b>Resources</b> are utilized in accordance with workplace policy.</p> <p>3.5 Work priorities are set in accordance to workplace goals and objectives.</p> <p>3.6 Leisure time is recognized and utilized in line with personal objectives.</p> <p>3.7 <b>Drugs and substances of abuse</b> are identified and avoided based on workplace policy.</p> <p>3.8 HIV and AIDS prevention awareness is demonstrated in line with workplace policy.</p> <p>3.9 Safety consciousness is demonstrated in the workplace based on organization safety policy.</p> <p>3.10 <b>Emerging issues</b> are identified and dealt with in accordance with organization policy.</p>
4. Lead a workplace team	<p>4.1 Performance targets for the <b>team</b> are set based on organization’s objectives</p> <p>4.2 Duties are assigned in accordance with the organization policy.</p> <p>4.3 <b>Forms of communication</b> in a team are established according to organization’s policy.</p> <p>4.4 Team performance is evaluated based on set targets as per workplace policy.</p> <p>4.5 Conflicts are resolved between team members in line with organization policy.</p> <p>4.6 Gender related issues are identified and mainstreamed in accordance workplace policy.</p> <p>4.7 Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010.</p> <p>4.8 Healthy relationships are developed and maintained in line with workplace.</p>
5. Plan and organize work	<p>5.1 Work plans are prepared based on activities and budget.</p> <p>5.2 Assigned tasks are interpreted and expectations identified as per the workplace instructions.</p>

	<p>5.3 Task occupational safety and health requirements are identified and observed regulations.</p> <p>5.4 Work resources are identified, mobilized, allocated and utilized based on organization work plans.</p> <p>5.5 Work activities are monitored and evaluated in line with work plans and workplace policy.</p> <p>5.6 Work plans are reviewed based on target and available resources.</p>
6. Maintain professional growth and development	<p>6.1 Personal training needs are identified and assessed in line with the requirements of the job.</p> <p>6.2 <b>Training and career opportunities</b> are identified and utilized based on job requirements.</p> <p>6.3 Resources for training are mobilized and allocated based organizations and individual skills needs.</p> <p>6.4 Licenses and certifications relevant to job and career are obtained and renewed as per policy.</p> <p>6.5 Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives.</p> <p>6.6 Recognitions are sought as proof of career advancement in line with professional requirements.</p>
7. Demonstrate workplace learning	<p>7.1 Learning opportunities are sought and managed based on job requirement and organization policy.</p> <p>7.2 Improvement in performance is demonstrated based on courses attended.</p> <p>7.3 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job</p> <p>7.4 Time and effort is invested in learning new skills based on job requirements</p> <p>7.5 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.</p> <p>7.6 New systems are developed and maintained in accordance with the requirements of the job.</p> <p>7.7 Awareness of personal role in workplace <b>innovation</b> is demonstrated based on requirements of the job.</p>
8. Demonstrate problem solving skills	<p>8.1 Creative, innovative and practical solutions are developed based on the problem</p> <p>8.2 Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job.</p> <p>8.3 Team problems are solved as per the workplace</p>

	<p>guidelines</p> <p>8.4 Problem solving strategies are applied as per the workplace guidelines</p> <p>8.5 Problems are analyzed and assumptions tested as per the context of data and circumstances</p>
9. Manage ethical performance	<p>9.1 Policies and guidelines are observed as per the workplace requirements</p> <p>9.2 Self-worth and professionalism is exercised in line with personal goals and organizational policies</p> <p>9.3 Code of conduct is observed as per the workplace requirements</p> <p>9.4 Integrity is demonstrated as per legal requirement</p>

### RANGE

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

Variable	Range
1. Drug and substance abuse may include but not limited to:	<p>Commonly abused</p> <ul style="list-style-type: none"> <li>• Alcohol</li> <li>• Tobacco</li> <li>• Miraa</li> <li>• Over-the-counter drugs</li> <li>• Cocaine</li> <li>• Bhang</li> <li>• Glue</li> </ul>
2. Feedback may include but not limited to:	<ul style="list-style-type: none"> <li>• Verbal</li> <li>• Written</li> <li>• Informal</li> <li>• Formal</li> </ul>
3. Relationships may include but not limited to:	<ul style="list-style-type: none"> <li>• Man/Woman</li> <li>• Trainer/trainee</li> <li>• Employee/employer</li> <li>• Client/service provider</li> <li>• Husband/wife</li> <li>• Boy/girl</li> <li>• Parent/child</li> <li>• Sibling relationships</li> </ul>



4. Forms of communication may include but not limited to:	<ul style="list-style-type: none"> <li>• Written</li> <li>• Visual</li> <li>• Verbal</li> <li>• Non verbal</li> <li>• Formal and informal</li> </ul>
5. Team may include but not limited to:	<ul style="list-style-type: none"> <li>• Small work group</li> <li>• Staff in a section/department</li> <li>• Inter-agency group</li> </ul>
6. Personal growth may include but not limited to:	<ul style="list-style-type: none"> <li>• Growth in the job</li> <li>• Career mobility</li> <li>• Gains and exposure the job gives</li> <li>• Net workings</li> <li>• Benefits that accrue to the individual as a result of noteworthy performance</li> </ul>
7. Personal objectives may include but not limited to:	<ul style="list-style-type: none"> <li>• Long term</li> <li>• Short term</li> <li>• Broad</li> <li>• Specific</li> </ul>
8. Trainings and career opportunities may include but not limited to	<ul style="list-style-type: none"> <li>• Participation in training programs</li> <li>• Serving as Resource Persons in conferences and workshops</li> </ul>
9. Resource may include but not limited to:	<ul style="list-style-type: none"> <li>• Human</li> <li>• Financial</li> <li>• Technology</li> </ul>
10. Innovation may include but not limited to:	<ul style="list-style-type: none"> <li>• New ideas</li> <li>• Original ideas</li> <li>• Different ideas</li> <li>• Methods/procedures</li> <li>• Processes</li> <li>• New tools</li> </ul>
11. Emerging issues may include but not limited to:	<ul style="list-style-type: none"> <li>• Terrorism</li> <li>• Social media</li> <li>• National cohesion</li> <li>• Open offices</li> </ul>
12. Range of media for learning may include but not limited to:	<ul style="list-style-type: none"> <li>• Mentoring</li> <li>• peer support and networking</li> <li>• IT and courses</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

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

### **Required Skills**

The individual needs to demonstrate the following skills:

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

### **Required Knowledge**

The individual needs to demonstrate knowledge of:

- Work values and ethics
- Company policies
- Company operations, procedures and standards
- Occupational Health and safety procedures
- Fundamental rights at work
- Workplace communication
- Concept of time
- Time management
- Decision making
- Types of resources
- Work planning
- Organizing work
- Monitoring and evaluation
- Record keeping
- Gender mainstreaming
- HIV and AIDS
- Drug and substance abuse
- Professional growth and development
- Technology in the workplace
- Innovation
- Emerging issues

## EVIDENCE GUIDE

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

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Conducted self-management</li> <li>1.2 Demonstrated interpersonal communication</li> <li>1.3 Demonstrated critical safe work habits</li> <li>1.4 Demonstrated the ability to lead a workplace team</li> <li>1.5 Planned and organized work</li> <li>1.6 Maintained professional growth and development</li> <li>1.7 Demonstrated workplace learning</li> <li>1.8 Demonstrated problem solving skills</li> <li>1.9 Demonstrated the ability to manage performance ethically</li> </ul>
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace where assessment can take place</li> <li>2.2 Appropriately simulated environment where assessment can take place</li> </ul>
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral questioning</li> <li>3.3 Written test</li> <li>3.4 Portfolio of Evidence</li> <li>3.5 Interview</li> <li>3.6 Third party report</li> </ul>
4. Context of Assessment	<p>Competency may be assessed:</p> <ul style="list-style-type: none"> <li>4.1 On-the-job</li> <li>4.2 Off-the -job</li> <li>4.3 During Industrial attachment</li> </ul>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

## DEMONSTRATE ENVIRONMENTAL LITERACY

**UNIT CODE:** CON/OS/ARC/BC/06/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements.  <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Control environmental hazard	1.1 Storage methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS. 1.2 Disposal methods of hazardous wastes are followed according to environmental regulations and OSHS. 1.3 <i><b>PPE</b></i> is used according to OSHS.
2. Control environmental Pollution	2.1 Environmental pollution <i><b>control measures</b></i> are implemented in accordance with international protocols. 2.2 Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999 2.3 Methods for minimizing noise pollution is complied with based on Noise and Excessive Vibration <i><b>Pollution and Control Regulations, 2009</b></i>
3. Demonstrate sustainable resource use	3.1 Methods for minimizing wastage are complied with based on organizational waste management guide 3.2 Waste management procedures are employed

	<p>following principles of 3Rs (Reduce, Reuse, Recycle)</p> <p>3.3 Methods for economizing and reducing resource consumption are practiced as per the Constitution of Kenya 2010 Article 69 .</p>
4. Evaluate current practices in relation to resource usage	<p>4.1 Information on resource efficiency systems and procedures are collected and provided as per work groups/sector</p> <p>4.2 Current resource usage is measured and recorded as per work group</p> <p>4.3 Current purchasing strategies are analyzed and recorded according to industry procedures.</p> <p>4.4 Current work processes to access information and data is analyzed following enterprise protocol.</p>
5. Identify environmental legislations/conventions for environmental concerns	<p>5.1 Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact</p> <p>5.2 Industrial standard/environmental practices are described according to the different environmental concerns</p>
6. Implement specific environmental programs	<p>6.1 Programs/Activities are identified according to organizations policies and guidelines.</p> <p>6.2 Individual roles/responsibilities are determined and performed based on the activities identified.</p> <p>6.3 Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines</p> <p>6.4 Stakeholders are consulted based on company guidelines</p>
7. Monitor activities on Environmental protection/Programs	<p>7.1 Activities are periodically monitored and Evaluated according to the objectives of the environmental program</p> <p>7.2 Feedback from stakeholders are gathered and considered in Proposing enhancements to the program based on consultations</p> <p>7.3 Data gathered are analyzed based on Evaluation requirements</p> <p>7.4 Recommendations are submitted based on the findings</p> <p>7.5 Management support systems are set/established to sustain and enhance the program</p> <p>7.6 Environmental incidents are monitored and</p>

	reported to 7.7 concerned/proper authorities
8. Analyze resource use	8.1 All resource consuming processes are Identified as per the organizational work plan 8.2 Quantity and nature of resource consumed is determined based on processes 8.3 Resource flow is analyzed as per different parts of the process. 8.4 Wastes are classified according to NEMA regulations on waste management.
9. Develop resource Conservation plans	9.1. Efficiency of use/conversion of resources is determined according to industry protocol. 9.2. Causes of low efficiency of use of resources are Determined based on industry protocol. 9.3. Plans for increasing the efficiency of resource use are developed based on findings.

## RANGE

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

Variable	Range
1. PPE may include but not limited to	<ul style="list-style-type: none"> <li>• Mask</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety hat</li> <li>• Overall</li> <li>• Hearing protector</li> </ul>
2. Control measures may include but not limited to	<ul style="list-style-type: none"> <li>• Methods for minimizing or stopping spread and ingestion of airborne particles</li> <li>• Methods for minimizing or stopping spread and ingestion of gases and fumes</li> <li>• Methods for minimizing or stopping spread and ingestion of liquid wastes</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

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

## Required Skills

The individual needs to demonstrate the following skills:

- Measuring
- Recording
- Analytical
- Monitoring
- Communication
- Writing

## Required Knowledge

The individual needs to demonstrate knowledge of:

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

## EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate:  1.1 Controlled environmental hazard 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use 1.4 Evaluated current practices in relation to resource usage 1.5 Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 1.6 Described industrial standard environmental practices according to the different environmental issues/concerns. 1.7 Resolved problems/ constraints encountered based on management standard procedures 1.8 Implemented and monitored environmental practices on a
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	<p>periodic basis as per company guidelines</p> <p>1.9 Recommended solutions for the improvement of the program</p> <p>1.10 Monitored and reported to proper authorities any environmental incidents</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Workplace with storage facilities</p> <p>2.2 Tools, materials and equipment relevant to the tasks (e.g. Cleaning tools, cleaning materials, trash bags)</p> <p>2.3 PPE, manuals and references</p> <p>2.4 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection</p> <p>2.5 Case studies/scenarios relating to environmental Protection</p>
3 Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4 Context of Assessment	<p>Competency may be assessed</p> <p>4.1 On-the-job</p> <p>4.2 Off-the-job</p> <p>4.3 During Industrial attachment</p>
5 Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>



## DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: CON/OS/ARC/BC/07/6/A

### UNIT DESCRIPTION

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

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Identify workplace hazards and risk	1.1 <i><b>Hazards</b></i> in the workplace are identified <i><b>based their indicators</b></i> 1.2 Risks and hazards are evaluated based on legal requirements. 1.3 <i><b>OSH concerns</b></i> raised by workers are addressed as per legal requirements.
2. Control OSH hazards	2.1 Hazard prevention <i><b>and control measures</b></i> are implemented as per legal requirement. 2.2 Risk assessment is conducted and a risk matrix developed based on likely impact. 2.3 <i><b>Contingency measures</b></i> , including <i><b>emergency procedures</b></i> during workplace <i><b>incidents and emergencies</b></i> are recognized and established in accordance with organization procedures.
3. Implement OSH programs	3.1 Company OSH program are identified, evaluated and reviewed based on legal requirements. 3.2 Company OSH programs are implemented as per legal requirements. 3.3 Workers are capacity built on OSH standards and procedures as per legal requirements 3.4 <i><b>OSH-related records</b></i> are maintained as per legal requirements.

## RANGE

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

Variable	Range
1. Hazards may include but not limited to:	<ul style="list-style-type: none"> <li>• Physical hazards – impact, illumination, pressure, noise,</li> <li>• vibration, extreme temperature, radiation</li> <li>• Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects</li> <li>• Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors</li> <li>• Ergonomics</li> <li>• Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure,</li> <li>• varying metabolic cycles</li> <li>• Physiological factors – monotony, personal relationship, work out cycle</li> <li>• Safety hazards (unsafe workplace condition) – confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris</li> <li>• Unsafe workers’ act (Smoking in off-limited areas, Substance and alcohol abuse at work)</li> </ul>
2. Indicators may include but not limited to:	<ul style="list-style-type: none"> <li>• Increased of incidents of accidents, injuries</li> <li>• Increased occurrence of sickness or health complaints/ symptoms</li> <li>• Common complaints of workers related to OSH</li> <li>• High absenteeism for work-related reasons</li> </ul>
3. OSH concerns may include but not limited to:	<ul style="list-style-type: none"> <li>• Workers’ experience/observance on presence of work hazards</li> <li>• Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks)</li> <li>• Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines</li> </ul>

<p>4. Safety gears /PPE (Personal Protective Equipment) may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Arm/Hand guard, gloves</li> <li>• Eye protection (goggles, shield)</li> <li>• Hearing protection (ear muffs, ear plugs)</li> <li>• Hair Net/cap/bonnet</li> <li>• Hard hat</li> <li>• Face protection (mask, shield)</li> <li>• Apron/Gown/coverall/jump suit</li> <li>• Anti-static suits</li> <li>• High-visibility reflective vest</li> </ul>
<p>5. Appropriate risk controls may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Appropriate risk controls in order of impact are as follows:</li> <li>• Eliminate the hazard altogether (i.e., get rid of the dangerous machine)</li> <li>• Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off)</li> <li>• Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)</li> <li>• Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage)</li> <li>• Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users)</li> <li>• Use personal protective equipment (i.e., wear gloves and goggles when using the machine)</li> </ul>
<p>6. Contingency measures may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Evacuation</li> <li>• Isolation</li> <li>• Decontamination</li> <li>• (Calling designed) emergency personnel</li> </ul>
<p>7. Incidents and emergencies may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Chemical spills</li> <li>• Equipment/vehicle accidents</li> <li>• Explosion</li> <li>• Fire</li> <li>• Gas leak</li> <li>• Injury to personnel</li> <li>• Structural collapse</li> <li>• Toxic and/or flammable vapors emission.</li> </ul>

8. OSH-related Records may include but not limited to:	<ul style="list-style-type: none"> <li>• Medical/Health records</li> <li>• Incident/accident reports</li> <li>• Sickness notifications/sick leave application</li> <li>• OSH-related trainings obtained</li> </ul>
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## 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: <ul style="list-style-type: none"> <li>1.1 Identified hazards in the workplace based their indicators</li> <li>1.2 Evaluated workplace hazards based on legal requirements.</li> <li>1.3 Addressed OSH concerns raised by workers as per legal requirements.</li> </ul>
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	<p>1.4 Implemented hazard prevention and control measures as per legal requirement.</p> <p>1.5 Conducted risk assessment as per legal requirement.</p> <p>1.6 Developed risk matrix based on likely impact.</p> <p>1.7 Recognized and established contingency measures in accordance with organization procedures.</p> <p>1.8 Identified, evaluated and reviewed company OSH program based on legal requirements.</p> <p>1.9 Implemented company OSH programs as per legal requirements.</p> <p>1.10 Capacity built workers on OSH standards and procedures as per legal requirements</p> <p>1.11 Maintained OSH-related records as per legal requirements.</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.3 Access to relevant workplace where assessment can take place</p> <p>2.4 Appropriately simulated environment where assessment can take place</p>
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4. Context of Assessment	<p>Competency may be assessed:</p> <p>4.1 On-the-job</p> <p>4.2 Off-the –job</p> <p>4.3 During Industrial attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

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## COMMON UNITS OF COMPETENCY

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## APPLY MATHEMATICAL SKILLS

**UNIT CODE:** CON/OS/ARC/CC/01/6/A

### UNIT DESCRIPTION:

This unit describes the competencies required by a technician in order to apply algebra, trigonometry and hyperbolic functions, complex numbers, coordinate geometry, carry out binomial expansion, apply calculus, solve ordinary differential equations, carry out mensuration, apply power series, statics, latitudes and longitudes, vector theory, matrix and Numerical methods.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> This describes the key outcomes which make up workplace functions	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>Bold and italicised terms are elaborated in the range</i>
1. Apply algebra	1.1 Calculations involving Indices are performed as per the concept 1.2 Calculations involving Logarithms are performed as per the concept 1.3 Scientific calculator is used in solving mathematical problems in line with manufacturer's manual 1.4 Simultaneous equations are performed as per the rules 1.5 Quadratic equations are calculated as per the concept
2. Apply Trigonometry and hyperbolic functions	2.1 calculations are performed using trigonometric rules 2.2 calculations are performed using hyperbolic functions
3. Apply complex numbers	3.1 complex numbers are represented using Argand diagrams 3.2 Operations involving complex numbers are performed 3.3 Calculations involving complex numbers are performed using De Moivre's theorem
4. Apply Coordinate Geometry	4.1 Polar equations are calculated using coordinate geometry 4.2 Graphs of given polar equations are drawn using the Cartesian plane 4.3 Normal and tangents are determined using coordinate geometry
5. Carry out Binomial Expansion	5.1 Roots of numbers are determined using binomial theorem 5.2 Errors of small changes are determined using binomial theorem
6. Apply Calculus	6.1 Derivatives of functions are determined using Differentiation 6.2 Derivatives of hyperbolic functions are determined using Differentiation 6.3 Derivatives of inverse trigonometric functions are



	<p>determined using Differentiation</p> <p>6.4 Rate of change and small change are determined using Differentiation.</p> <p>6.5 Calculation involving stationery points of functions of two variables are performed using differentiation.</p> <p>6.6 Integrals of algebraic functions are determined using integration</p> <p>6.7 Integrals of trigonometric functions are determined using integration</p> <p>6.8 Integrals of logarithmic functions are determined using integration</p> <p>6.9 Integrals of hyperbolic and inverse functions are determined using integration</p>
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7. Solve Ordinary differential equations	7.1 First order and second order differential equations are solved using the method of undetermined coefficients 7.2 First order and second order differential equations are solved from given boundary conditions
8. Carry out Mensuration	8.1 Perimeter and areas of figures are obtained 8.2 Volume and of Surface area of solids are obtained 8.3 Area of irregular figures are obtained 8.4 Areas and volumes are obtained using Pappus theorem
9. Apply Power Series	9.1 Power series are obtained using Taylor's Theorem 9.2 Power series are obtained using Maclaurin's 's theorem
10. Apply Statistics	10.1 Identification, Collection and Organization of data is performed 10.2 Interpretation, analysis and presentation of data in appropriate format is performed 10.3 Mean, median, mode and Standard deviation are obtained from given data 10.4 Calculations are performed based on Laws of probability 10.5 Calculation involving probability distributions, mathematical expectation sampling distributions are performed 10.6 Sampling distribution methods are applied in data analysis 10.7 Calculations involving use of standard normal table, sampling distribution, T-distribution and Estimation are done 10.8 Confidence intervals are determined 10.9 Testing hypothesis using large samples and small samples are performed 10.10 Calculations involving Correlation and regression are done 10.11 Calculations involving rank correlation coefficient and equations of regression line are done
11. Latitudes and Longitudes	11.1 Latitudes and longitudes are determined 11.2 Distance and time between two points along small and great circle are determined 11.3 Speed is determined
12. Apply Vector theory	12.1 Vectors and scalar quantities are obtained in two and three dimensions 12.2 <b>Operations</b> on vectors are performed

	12.3 Position of vectors is obtained 12.4 Resolution of vectors is done
13. Apply Matrix	13.1 Determinant and inverse of 3x3 matrix are obtained 13.2 Solutions of simultaneous equations are obtained 13.3 Calculation involving Eigen values and Eigen vectors are performed
14. Apply Numerical methods	14.1 Roots of polynomials are obtained using iterative numerical methods 14.2 interpolation and extrapolation are performed using numerical methods

### 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. Operations may include but not limited to:	<ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> </ul>
2. Hyperbolic functions may include but not limited to:	<ul style="list-style-type: none"> <li>• Sinh x</li> <li>• Cosh x</li> <li>• Cosec x</li> <li>• Coth x</li> <li>• Tanh x</li> <li>• Sech x</li> </ul>

### 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:

- Applying fundamental operations (addition, subtraction, division, multiplication)
- using and applying mathematical formulas
- logical thinking
- problem solving
- applying statistics
- drawing graphs
- Using different measuring tools

#### Required knowledge

The individual needs to demonstrate knowledge of:

- Fundamental operations (addition, subtraction, division, multiplication)

- calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Rounding techniques
- Types of fractions
- Types of tables and graphs
- Presentation of data in tables and graphs
- Vector operations
- Matrix 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: 1.1 Applied Trigonometry and hyperbolic functions 1.2 Applied complex numbers 1.3 Applied Calculus 1.4 Solved Ordinary differential equations 1.5 Carried out mensuration 1.6 Applied Power Series 1.7 Applied Latitudes and Longitudes 1.8 Applied Vector theory 1.9 Applied Matrix 1.10 Applied Numerical methods
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring equipment 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Written test 3.4 Portfolio of Evidence 3.5 Interview 3.6 Third party report
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial Attachment
5. Guidance information for	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

assessment	
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## PREPARE AND INTERPRET TECHNICAL DRAWINGS

UNIT CODE: CON/OS/ARC/CC/02/6/A

### UNIT DESCRIPTION

This unit covers the competencies required to prepare and interpret technical drawings. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings and application of Computer Aided Design (CAD) packages.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. ( <i>Bold and italicised terms are elaborated in the Range</i> )
1. Use and maintain drawing equipment and materials	1.1 <i>Drawing equipment</i> are identified and gathered according to task requirements 1.2 <i>Drawing materials</i> are identified and gathered according to task requirements 1.3 Drawing equipment are used and maintained as per manufacturer's instructions 1.4 Drawing materials are used as per workplace procedures 1.5 Waste materials are disposed in accordance with workplace procedures and <i>environmental legislations</i> 1.6 <i>Personal Protective Equipment</i> is used according to occupational safety and health regulations
2. Produce plane geometry drawings	2.1 Different types of lines used in drawing and their meanings are identified according to standard drawing conventions 2.2 Different types of <i>geometric forms</i> are constructed according to standard conventions 2.3 Different types of angles are constructed according to principles of trigonometry 2.4 Different types of angles are measured using appropriate measuring tools 2.6 Angles are bisected according to standard conventions 2.7 Freehand sketching of different types of geometric forms, tools, equipment, diagrams is conducted

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicised terms are elaborated in the Range)</i>
3. Produce solid geometry drawings	3.1 Drawings of patterns are interpreted according to standard conventions 3.2 Patterns are developed in accordance with standard conventions
4. Produce orthographic and pictorial drawings	4.1 Symbols and abbreviations are identified, and their meaning interpreted according to standard drawing conventions 4.2 First and third angle orthographic drawings are interpreted and produced in accordance with the standard conventions 4.3 Orthographic elevations are dimensioned in accordance with standard conventions 4.4 Isometric drawings are interpreted and produced in accordance with standard conventions
5. Apply CAD packages	5.1 CAD packages are selected according to task requirements 5.2 CAD packages are applied in production of drawings

### **RANGE**

<b>Variable</b>	<b>Range</b>
1. Drawing equipment may include but not limited to:	<ul style="list-style-type: none"> <li>• Drawing boards</li> <li>• T and set squares</li> <li>• drawing sets</li> <li>• computers with CAD packages</li> </ul>
2. Drawing materials may include but not limited to:	<ul style="list-style-type: none"> <li>• Drawing papers</li> <li>• Pencils</li> <li>• Erasers</li> <li>• masking tapes</li> <li>• paper clips</li> </ul>
3. Environmental legislations include but	<ul style="list-style-type: none"> <li>• EMCA 1999</li> </ul>

not limited to:	
4. Personal Protective Equipment may include but not limited to:	<ul style="list-style-type: none"> <li>• Dust coats</li> <li>• closed leather shoes</li> </ul>
5. Geometric forms may include but not limited to:	<ul style="list-style-type: none"> <li>• Circles</li> <li>• Triangles</li> <li>• Rectangles</li> <li>• Parallelogram</li> <li>• Polygons</li> <li>• Pyramids</li> <li>• conic sections</li> <li>• prisms</li> <li>• loci</li> </ul>
6. Standard conventions may include but not limited to:	<ul style="list-style-type: none"> <li>• Anatomy of engineering drawing (title block, coordinate grid system, revision block, notes and legends)</li> <li>• Drawing scale (paper size and drawing symbols)</li> <li>• International drawing standards</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

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

### Required skills

The individual needs to demonstrate the following skills:

- Critical thinking
- Drawing
- Interpretation
- Drawing equipment handling
- Analysis and synthesis
- Communication
- Inter personal

### Required knowledge

The individual needs to demonstrate knowledge of:

- Drawing equipment and materials
- Freehand sketching
- Lettering



- Geometrical constructions
- Types of drawings
- Types of lines
- Isometric drawing conventions, features, characteristics, components
- Orthographic drawing conventions, features, characteristics, components
- Sketches and drawings of simple patterns

## 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: <ul style="list-style-type: none"> <li>1.1 Applied and adhered to safety procedures</li> <li>1.2 Cared and maintained drawing equipment</li> <li>1.3 Interpreted circuit, assembly and lay out diagrams</li> <li>1.4 Applied appropriate technical standards, used proper tools and equipment for a given task</li> <li>1.5 Produced sketches and drawings</li> <li>1.6 Applied CAD packages in production of drawings</li> </ul>
2. Resource Implications	Resources the same as that of workplace are advised to be applied. <ul style="list-style-type: none"> <li>2.1 Drawing room</li> <li>2.2 Drawing equipment and materials</li> <li>2.3 Computers</li> <li>2.4 CAD packages</li> </ul>
3. Methods of Assessment	Competency may be assessed through: <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral questioning</li> <li>3.3 Written test</li> <li>3.4 Portfolio of Evidence</li> <li>3.5 Interview</li> <li>3.6 Third party report</li> </ul>
4. Context of Assessment	Competency may be assessed <ul style="list-style-type: none"> <li>4.1 On job</li> <li>4.2 Off job</li> <li>4.3 During Industrial Attachment</li> </ul>
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

## APPLY BUILDING MATERIALS SCIENCE

**UNIT CODE:** CON/OS/ARC/CC/03/6/A

### UNIT DESCRIPTION

This unit describes the competence in applying building materials science. It involves identifying essential and properties of construction materials, manufacturing construction materials, selecting quality construction materials, using construction materials properly, testing construction materials and handling construction materials safely.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
1 Identify essential construction materials	1.1 Bills of quantities and working drawings are obtained and interpreted 1.2 Essential <b><i>construction materials</i></b> are identified based on construction requirements and project scope
2 Identify properties of construction materials	2.1 <b><i>Physical properties</i></b> of construction materials are identified based on the type of construction material and codes of practice 2.2 <b><i>Chemical properties</i></b> of construction materials are identified based on the type of construction material and codes of practice 2.3 <b><i>Mechanical properties</i></b> of construction materials are identified based on the type of construction material and codes of practice
3 Manufacture construction materials	3.1 Raw materials are identified based on construction materials to be produced 3.2 Construction materials are manufactured as per manufacturing procedures
4 Select quality construction materials	4.1 Cost implications of construction materials are evaluated and analyzed 4.2 Quality construction materials are selected based on their costs and project requirements
5 Use construction materials appropriately	5.1 Construction materials, tools and equipment are assembled based on construction methods

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
	5.2 Construction materials are used based on construction process
6 Test construction materials	6.1 Construction materials are sampled randomly as per SOPs 6.2 <b><i>Test parameters</i></b> are identified as per the construction requirements and engineer's instructions 6.3 Construction materials are tested as per the SOPs
7 Handle construction materials safely	7.1 Construction materials to be handled are identified 7.2 Safety requirements are identified based on the construction materials 7.3 Construction materials are handled safely based on the safety requirements

### RANGE

<b>Variable</b>	<b>Range</b>
1. Construction materials may include but not limited to:	<ul style="list-style-type: none"> <li>• stones</li> <li>• bricks</li> <li>• clay and clay products</li> <li>• lime</li> <li>• cement</li> <li>• timber and timber products</li> <li>• metals and alloys</li> <li>• paints and varnishes</li> <li>• roofing materials</li> </ul>
2. physical properties may include but not limited to:	<ul style="list-style-type: none"> <li>• porosity</li> <li>• surface texture</li> <li>• strength</li> <li>• density</li> <li>• thermal conductivity</li> <li>• wear and tear</li> </ul>
3. chemical properties may include but not limited to:	<ul style="list-style-type: none"> <li>• corrosion resistance</li> <li>• chemical resistance</li> </ul>
4. Mechanical	<ul style="list-style-type: none"> <li>• Toughness</li> </ul>

properties may include but not limited to:	<ul style="list-style-type: none"> <li>• Hardness</li> <li>• Fatigue</li> <li>• Stress and strain</li> <li>• Creep and stress rapture</li> </ul>
5. Test parameters may include but not limited to:	<ul style="list-style-type: none"> <li>• Compression</li> <li>• Weathering</li> <li>• Durability</li> <li>• Water absorption</li> <li>• Impurity tests</li> <li>• Tensile tests</li> </ul>

### REQUIRED KNOWLEDGE

- Applied science
- Construction materials
- Materials testing
- Quality assurance
- Management of material resources
- Engineering mathematics
- Bills of quantities
- Materials handling safety procedures

### SKILLS

- Analytical
- Quality control analysis
- Complex problem solving
- Critical thinking
- Engineering drawings interpretation
- Monitoring
- Numeracy

### 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: <ul style="list-style-type: none"> <li>1.1 Identified essential construction materials</li> <li>1.2 Selected quality construction materials</li> <li>1.3 Tested construction materials</li> <li>1.4 Manufactured construction materials</li> <li>1.5 Identified properties of construction materials</li> <li>1.6 Appropriately used construction materials</li> <li>1.7 Handled construction materials safely</li> </ul>
2. Resource	The following resources should be provided:

Implications		<ul style="list-style-type: none"> <li>2.1 Samples of construction materials</li> <li>2.2 Material Testing Laboratories</li> <li>2.3 Safety equipment</li> <li>2.4 Computers</li> <li>2.5 Calculators</li> <li>2.6 Materials testing tools and equipment</li> </ul>
3. Methods of Assessment	of	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral questioning</li> <li>3.3 Written test</li> <li>3.4 Portfolio of Evidence</li> <li>3.5 Interview</li> <li>3.6 Third party report</li> </ul>
4. Context of Assessment	of	<p>Competency may be assessed</p> <ul style="list-style-type: none"> <li>4.1 On The Job</li> <li>4.2 Off The Job</li> <li>4.3 During Industrial Attachment.</li> </ul>
5. Guidance information for assessment	for	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## APPLY WORKSHOP TECHNOLOGY PRACTICES

**UNIT CODE:** CON/OS/ARC/CC/04/6/A

### UNIT DESCRIPTION

This unit describes the competence in applying workshop technology practices. It entails performing masonry, plumbing and carpentry tasks. It also involves performing electrical and mechanical operations.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
1 Perform masonry tasks	1.1 Safety requirements in the workshop environment are identified 1.2 <b><i>Masonry hand tools</i></b> are used appropriately to perform tasks in masonry workshop 1.3 <b><i>Masonry machine tools</i></b> are used appropriately to perform tasks in masonry workshop 1.4 Masonry tools used in construction works are maintained as per manufacturer's specifications
2 Perform plumbing tasks	2.1 Safety requirements in the workshop environment are identified 2.2 <b><i>Plumbing hand tools</i></b> are used appropriately to perform tasks in plumbing workshop 2.3 <b><i>Plumbing machine tools</i></b> are used appropriately to perform tasks in plumbing workshop 2.4 Plumbing tools used in construction works are maintained as per manufacturer's specifications
3 Perform carpentry tasks	3.1 Safety requirements in the workshop environment are identified 3.2 <b><i>Carpentry hand tools</i></b> are used appropriately to perform tasks in carpentry workshop 3.3 <b><i>Carpentry machine tools</i></b> are used appropriately to perform tasks in carpentry workshop 3.4 Carpentry tools used in construction works are maintained as per manufacturer's specifications
4 Perform electrical operations	4.1 Safety requirements in the workshop environment are identified as per SOPs 4.2 <b><i>Conventional tools</i></b> used in electrical workshop are

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
	<p>identified as per SOPs</p> <p>4.3 Power supply sources are identified as per SOPs</p> <p>4.4 Basic electrical circuits are installed and maintained as per IEE regulations</p>
5 Perform mechanical operations	<p>5.1 Safety requirements in the workshop environment are identified as per SOPs</p> <p>5.2 <b>Mechanical hand tools</b> are used appropriately to perform tasks in mechanical workshop</p> <p>5.3 Diesel and petrol engine components are identified based on their functions and engine system</p> <p>5.4 Diesel and petrol engines are operated based on manufacturer's manual</p> <p>5.5 Simple engine maintenance is performed as per manufacturer's specifications</p> <p>5.6 <b>Water pumps</b> are identified based on working principle</p> <p>5.7 Basic maintenance is performed on water pumps as per SOPs</p>

### RANGE

<b>Variable</b>	<b>Range</b>
1. Masonry hand tools may include but not limited to:	<ul style="list-style-type: none"> <li>• Masons trowel</li> <li>• Wood float</li> <li>• Cold chisels</li> <li>• Masons square</li> <li>• Spade</li> <li>• Shovel</li> <li>• Plumb bob</li> </ul>
2. Masonry machine tools may include but not limited to:	<ul style="list-style-type: none"> <li>• Concrete mixer</li> <li>• Block cutter</li> <li>• Vibrator</li> <li>• Pneumatic hammer</li> <li>• compactors</li> </ul>
3. Plumbing hand tools may include but not limited to:	<ul style="list-style-type: none"> <li>• Bench shears</li> <li>• Anvil</li> <li>• Pipe wrench</li> <li>• Pliers</li> </ul>

4. Plumbing machine tools may include but not limited to:	<ul style="list-style-type: none"> <li>• Bending machine</li> <li>• Welding</li> <li>• Sheet metal holding machine</li> <li>• Portable power drill</li> <li>• Hand grinder</li> </ul>
5. Carpentry hand tools may include but not limited to:	<ul style="list-style-type: none"> <li>• Saws</li> <li>• Planes</li> <li>• Hammer</li> <li>• Carpenter square</li> <li>• Marking gauges</li> <li>• Hand drill</li> <li>• Screw drivers</li> </ul>
6. Carpentry machine tools may include but not limited to:	<ul style="list-style-type: none"> <li>• circular saw</li> <li>• Thicknesser</li> <li>• Portable sander</li> <li>• Close cut saw</li> <li>• Portable drill machine</li> </ul>
7. Conventional tools include but not limited to:	<ul style="list-style-type: none"> <li>• phase tester</li> <li>• screw driver</li> <li>• pliers</li> <li>• long nose</li> <li>• side cutter</li> <li>• draw in wire</li> <li>• electrical knife</li> <li>• electrical hammer</li> </ul>
8. Mechanical hand tools include but not limited to:	<ul style="list-style-type: none"> <li>• Arc welding shields</li> <li>• Leather gloves</li> <li>• Chipping hammers</li> <li>• Welding goggles</li> <li>• Tongs</li> <li>• Hand vices</li> <li>• Mole punch</li> <li>• Pliers</li> <li>• Vernier callipers</li> <li>• Scribes</li> <li>• Hacksaw</li> <li>• Tinsnips</li> <li>• Pullers</li> </ul>
9. Water pumps may include but not limited to:	<ul style="list-style-type: none"> <li>• Centrifugal</li> <li>• Submersible</li> </ul>



	<ul style="list-style-type: none"> <li>• Reciprocating pump</li> <li>• Hand pumps</li> </ul>
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### REQUIRED KNOWLEDGE

- Tools and equipment
- Safety regulations
- Mathematics
- Electrical installation
- Power supply
- Engine operations
- Plumbing
- Water pump operation
- Masonry
- Mortar mixing
- Carpentry and joinery
- Firefighting
- Circuit interpretation

### SKILLS

- Analytical
- Critical thinking
- Problem solving
- Firefighting
- Quality control
- Circuit interpretation

### 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	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Identified safety requirements in the workshop environment</li> <li>1.2 Performed masonry tasks</li> <li>1.3 Performed plumbing tasks</li> <li>1.4 Performed carpentry tasks</li> <li>1.5 Identified power supply sources</li> <li>1.6 Installed basic electrical circuits</li> <li>1.7 Identified diesel and petrol engine components</li> </ul>
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		<p>1.8 Operated diesel and petrol engines</p> <p>1.9 Identified water pumps</p> <p>1.10 Demonstrated knowledge on maintenance of water pumps and engines</p> <p>1.11 Appropriately used workshop tools</p>
2.	Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Working tools and equipment</p> <p>2.2 Diesel and petrol engines</p> <p>2.3 Water pumps</p> <p>2.4 Electrical appliances</p> <p>2.5 Training Workshops</p> <p>2.6 Plumbing materials</p> <p>2.7 Masonry materials</p> <p>2.8 Carpentry materials</p>
3.	Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4.	Context of Assessment	<p>Competency may be assessed</p> <p>4.1 On the job</p> <p>4.2 Off the job</p> <p>4.3 during industrial Attachment</p>
5.	Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

## APPLY PRINCIPLES OF BUILDING TECHNOLOGY AND SERVICES

UNIT CODE: CON/OS/ARC/CC/05/6/A

### UNIT DESCRIPTION

This unit describes the competence required to survey construction site, prepare construction site, construct substructure, construct superstructure, perform mechanical works, install electrical fittings, prepare reinforced concrete, produce building elements, apply building finishes and fittings and perform landscaping

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Survey construction site	1.1 Surveying principles are applied during all the phases of the construction according to contract drawings 1.2 Profiles, contours and maps are drawn based on surveyed data and contract drawings 1.3 Surveying equipment and tools are used according to their catalogues and technical standards. 1.4 Reconnaissance is performed 1.5 Levelling is conducted 1.6 Trial pits are excavated and tested
2. Prepare construction site	2.1 Occupational health and safety precautions are observed 2.2 Hoarding is erected as per workplace procedures 2.3 Site is cleared as per SOPs 2.4 Building is set out as per the design 2.5 Site is excavated as per foundation design
3. Construct substructure	3.1 <b>Foundation</b> is laid out as per the design 3.2 Foundation slab, walls, columns or beams are erected as per the design 3.3 Backfilling is performed as per building codes.
4. Construct superstructure	4.1 Concrete slab is laid as per the design 4.2 Walls, columns and beams are erected as per the design 4.3 <b>Roof</b> is constructed as per the design

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
5. Perform mechanical works	5.1 Pipework and service ducts are fixed out as per the design 5.2 Pipework and service ducts are tested 5.3 HVAC are fixed and tested as per design
6. Install electrical fittings	6.1 Safety precautions are observed as per workplace procedures 6.2 Electrical conduits and socket boxes are placed as per the design. 6.3 Electrical conduits are tested
7. Prepare <i>reinforced concrete</i>	7.1 <i>Formwork</i> is prepared as per building specifications 7.2 Steel fixing is performed as per design 7.3 Concreting is done as per design
8. Produce building elements	8.1 <i>Precast concrete</i> is produced 8.2 <i>Timber components</i> are fabricated 8.3 <i>Metal components</i> are fabricated 8.4 <i>Stabilized soil components</i> are produced
9. Apply building finishes and fittings	9.1 Building surfaces are prepared to receive finishes 9.2 <i>Building finishes and fittings</i> are installed/applied based on the type of finish 9.3 Finishes are inspected as per workplace procedures
10. Perform landscaping	10.1 Ground is prepared 10.2 Pathways and driveways are set out as per the design 10.3 Plants and vegetation are established 10.4 Pathways and driveways are laid as per the design
11. Perform building maintenance operations	11.1 The building is regularly inspected for any faults 11.2 Finishes are reapplied when needed

**RANGE**

Variable	Range

1. Foundation may include but not limited to:	<ul style="list-style-type: none"> <li>• Strip foundation</li> <li>• Pad foundation</li> <li>• Pile foundation</li> <li>• Raft foundation</li> </ul>
2. Roof may include but not limited to:	<ul style="list-style-type: none"> <li>• Flat roof</li> <li>• Pitched roof</li> </ul>
3. Reinforced concrete may include but not limited to:	<ul style="list-style-type: none"> <li>• RC slabs</li> <li>• RC beams</li> <li>• RC columns</li> </ul>
4. Precast concrete may include but not limited to:	<ul style="list-style-type: none"> <li>• Paving slabs</li> <li>• Road kerbs and channels</li> <li>• Precast concrete slabs</li> </ul>
5. Formwork may include but not limited to:	<ul style="list-style-type: none"> <li>• Timber</li> <li>• Aluminium</li> <li>• Steel</li> </ul>
6. Timber components may include but not limited to:	<ul style="list-style-type: none"> <li>• Chip boards</li> <li>• Ply wood</li> <li>• MDF boards</li> <li>• Marine boards</li> </ul>
7. Metal components may include but not limited to:	<ul style="list-style-type: none"> <li>• Steel bars</li> <li>• Aluminium frames</li> </ul>
8. Stabilized soil components include but not limited to:	<ul style="list-style-type: none"> <li>• Clay roofing tiles</li> <li>• Clay bricks</li> <li>• Clay vents</li> </ul>
9. Building finishes and fittings may include but not limited to:	<ul style="list-style-type: none"> <li>• Paint</li> <li>• Tiles</li> <li>• Ceiling</li> <li>• Gypsum</li> <li>• Wardrobes</li> <li>• Kitchen cabinets</li> </ul>

### REQUIRED KNOWLEDGE

- Safety precautions
- Masonry
- Carpentry and joinery
- Electrical works
- Mechanical works

- Surveying
- Finishes and fittings
- Metal works
- Construction materials, tools and equipment
- Occupational health and safety

### SKILLS

- Measuring
- Planning and organizing
- Analytical skills
- Levelling
- Management skills
- Setting out
- Finishing
- Mathematical skills
- Observation skills

### 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: <ul style="list-style-type: none"> <li>1.1 Conducted levelling</li> <li>1.2 Set out building</li> <li>1.3 Erected walls and beams</li> <li>1.4 Constructed roof</li> <li>1.5 Installed pipework and service ducts</li> <li>1.6 Placed electrical conduits and socket boxes</li> <li>1.7 Prepared formwork</li> <li>1.8 Prepared building surfaces to receive finishes</li> <li>1.9 Installed/ applied <b>building finishes and fittings</b></li> <li>1.10 Prepared ground for landscaping</li> </ul>
2. Resource Implications	The following resources should be provided: <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>2.2 Materials relevant to the proposed activity or tasks</li> </ul>
3 Methods of Assessment	Competency may be assessed through: <ul style="list-style-type: none"> <li>3.1 Observation</li> </ul>

			<p>3.2 Oral questioning</p> <p>3.3 Written test</p> <p>3.4 Portfolio of Evidence</p> <p>3.5 Interview</p> <p>3.6 Third party report</p>
4	Context Assessment	of	<p>Competency may be assessed</p> <p>4.1 on the job</p> <p>4.2 off the job</p> <p>4.3 during industrial Attachment</p>
5	Guidance information assessment	for	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

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## APPLY HISTORY OF ARCHITECTURE

**UNIT CODE:** CON/OS/ARC/CC/06/6/A

### UNIT DESCRIPTION

This unit describes the competence required to apply prehistoric and ancient building technology, classical building technology, apply neo-classism building technology and apply modernism and postmodernism building technology

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Apply prehistoric and ancient building technology (11600BC-476AD)	1.1 Evolution and origin of human architecture is analyzed and documented 1.2 <b><i>Pre-historic and ancient architecture</i></b> are identified, analyzed and sketched 1.3 Architectural building materials for pre-historic and ancient architecture are identified 1.4 Construction and maintenance techniques are identified as per the building
2. Apply classical building technology (527AD-1790)	2.1 Evolution and origin of classical architecture is analyzed and documented 2.2 <b><i>Classical architecture</i></b> are identified, analyzed and sketched 2.3 Architectural building materials for classical architecture are identified 2.4 Construction and maintenance techniques are identified as per the building
3. Apply neo-classism building technology (1730-1937)	3.1 Origin and evolution of neo-classic architecture is identified and analyzed 3.2 <b><i>Neo-classic architecture</i></b> is identified, analyzed and sketched 3.3 Architectural building materials for neo-classic architecture are identified 3.4 Construction and maintenance techniques are identified as per the building
4. Apply modernism and postmodernism building technology (1900-present)	4.1 Origin and evolution of modern and post-modern architecture is identified and analyzed 4.2 <b><i>Modern and post-modern architecture</i></b> are identified, analyzed and sketched



<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
	4.3 Architectural building materials for modern and post-modern architecture are identified 4.4 Construction and maintenance techniques are identified as per the building

### **RANGE**

<b>Variable</b>	<b>Range</b>
1. Pre-historic and ancient architecture may include but not limited to:	<ul style="list-style-type: none"> <li>• Stone age</li> <li>• Egyptian</li> </ul>
2. Classical architecture may include but not limited to:	<ul style="list-style-type: none"> <li>• Greek</li> <li>• Roman</li> <li>• Indian</li> <li>• South East Asia</li> <li>• Byzantine</li> <li>• Romanesque</li> <li>• Gothic</li> <li>• Renaissance</li> <li>• Baroque</li> <li>• Rococo</li> </ul>
3. Neo-classical architecture may include but not limited to:	<ul style="list-style-type: none"> <li>• Arts and craft movement</li> <li>• Neo-classism art nouveau</li> <li>• Beaux art</li> <li>• Neo-gothic</li> <li>• Art deco</li> </ul>
4. Modern and post-modern architecture may include but not limited to:	<ul style="list-style-type: none"> <li>• Modernist styles</li> <li>• Bauhaus</li> <li>• Surrealism</li> <li>• Cubism</li> <li>• Scandinavian</li> <li>• Bohemian</li> <li>• Mid-modern century</li> <li>• Post-modernism</li> <li>• Contemporary</li> </ul>

	<ul style="list-style-type: none"> <li>• Minimalistic</li> </ul>
5. Building materials may include but not limited to:	<ul style="list-style-type: none"> <li>• Stones</li> <li>• Wood</li> <li>• Soil</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

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

### REQUIRED SKILLS

- Research skills
- Analytical skills
- Detailing
- Presentation skills
- Basic ICT skills

### REQUIRED KNOWLEDGE

- Historical architectural structures
- Architectural building materials
- Art and design
- Principles of Architecture
- Perspectives
- Proportions
- Scales

### 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	<p>Assessment requires evidence that the candidate:</p> <p>1.1 Analyzed evolution and origin of historical architecture</p> <p>1.2 Identified, analyzed and sketched historical architectural structures</p> <p>1.3 Identified architectural building materials for pre-historic and ancient architecture</p> <p>1.4 Identified construction techniques for historical architectural structures</p>
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2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</p> <p>2.2 Materials relevant to the proposed activity or tasks</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Written text</p> <p>3.2 Interview</p> <p>3.3 Observation</p>
4. Context of Assessment	<p>Competency may be assessed</p> <p>4.1 on the job</p> <p>4.2 off the job</p> <p>4.3 during industrial Attachment</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

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## APPLY PRINCIPLES OF STRUCTURAL DESIGN

**UNIT CODE:** CON/OS/ARC/CC/07/6/A

### UNIT DESCRIPTION

This unit describes the competence required to analyze structural principles, evaluate design materials, design structural elements and select optimal structural design

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the Key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each element. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Analyze structural principles	1.1 Structural analysis of beams, trusses and frames is determined as per <i>standard manuals</i> 1.2 Deflection analysis of beams trusses and frames is determined as per standard manuals 1.3 Stability analysis of beams, trusses and frames is determined as per standard manuals 1.4 Column analysis is performed 1.5 Loads and load paths are computed as per concepts 1.6 Structural analysis is performed using computer aided design software
2. Evaluate design materials	2.1 <i>Design materials</i> are identified based on their properties and codes 2.2 Design materials are tested as per the <i>structural principles</i>
3. Design structural elements	3.1 Structural elements are identified as per codes 3.2 <i>Structural elements</i> are designed as per the codes and structural principles
4. Select optimal structural design	4.1 Structural arrangement is performed based on quality and performance 4.2 Structural elements are costed 4.3 Structural elements are selected based on quality and performance

### RANGE

<b>Variable</b>	<b>Range</b>
1. Standard manuals may include but not limited to:	<ul style="list-style-type: none"> <li>• BS (British) Standards</li> <li>• Euro code</li> </ul>

	<ul style="list-style-type: none"> <li>• KEBS</li> </ul>
2. Design materials may include but not limited to:	<ul style="list-style-type: none"> <li>• Masonry</li> <li>• Timber</li> <li>• Steel</li> <li>• Concrete</li> <li>• Composite materials</li> <li>• Plastic</li> <li>• Glass</li> </ul>
3. Structural principles concrete may include but not limited to:	<ul style="list-style-type: none"> <li>• Equilibrium</li> <li>• Geometric stability</li> <li>• Strength and rigidity</li> </ul>
4. Structural elements may include but not limited to:	<ul style="list-style-type: none"> <li>• Columns</li> <li>• Beams</li> <li>• Trusses</li> <li>• Plates</li> <li>• Shells</li> <li>• Arches</li> </ul>

### REQUIRED KNOWLEDGE

- Occupational health and safety procedures
- Principles of structural design
- Engineering mathematics
- Workshop technology
- Structural elements
- Structural materials
- Costing
- Design software
- Carpentry and joinery
- Technical drawing
- Surveying
- Construction materials, tools and equipment

### SKILLS

- Measuring
- Costing
- Drawing and design skills
- ICT skills
- Interpretation of structural designs
- Precision skills
- Planning and organizing
- Analytical skills

- Management skills
- Mathematical skills
- Observation skills

### 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: <ol style="list-style-type: none"> <li>1.1 Observed safety precautions</li> <li>1.2 Analyzed structural principles</li> <li>1.3 Performed structural analysis using computer aided design software</li> <li>1.4 Identified and tested design materials</li> <li>1.5 Identified and designed structural elements</li> <li>1.6 Selected optimal structural design</li> </ol>
2. Resource Implications	The following resources should be provided: <ol style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>2.2 Materials relevant to the proposed activity or tasks</li> </ol>
3. Methods of Assessment	Competency may be assessed through: <ol style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral questioning</li> <li>3.3 Written tests</li> <li>3.4 Drawings</li> <li>3.5 Practicals</li> </ol>
4. Context of Assessment	Competency may be assessed <ol style="list-style-type: none"> <li>4.1 on the job</li> <li>4.2 off the job</li> <li>4.3 During industrial Attachment</li> </ol>
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

## **CORE UNITS OF COMPETENCIES**

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## DESIGN AND DETAIL ARCHITECTURAL PROJECTS

**UNIT CODE:**CON/OS/ARC/CR/01/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to prepare a design brief, conduct site analysis, conduct literature review, carry out case study, perform activity study, prepare design brief, produce schematic drawings, prepare presentation drawings, prepare working drawings, prepare details drawings, revise working drawings and apply CADD in architectural work

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Prepare a design brief	1.1 <b><i>Design requirements</i></b> are noted as per the client's needs 1.2 The client's requirements are analyzed as per client's needs 1.3 Spaces and number of occupants are listed as per the client's needs 1.4 Client's cost expectation is noted 1.5 Compliance with local building regulations are established
2. Conduct site analysis	2.1 A survey map is acquired as per the site location 2.2 The site is visited as per the survey map 2.3 Site data is collected as observed 2.4 Collected data is analyzed based on design requirements 2.5 Site analysis report is prepared 2.6 Adjustments are proposed as per the site analysis
3. Conduct literature review	3.1 Research on design parameters is done as per spatial requirements 3.2 Research on material use is conducted as per spatial requirement 3.3 Research on historical backgrounds of similar projects is conducted
4. Carry out case study	4.1 An identical existing project is identified 4.2 The identified project is visited 4.3 Observations are recorded as per workplace



	<p>procedures</p> <p>4.4 Analysis of the observations is done</p> <p>4.5 Conclusions and recommendations are made as per the existing project.</p> <p>4.6 Sound findings are adopted in the proposed project</p>
5. Prepare design concept	<p>5.1 An emotional/psychological/spiritual attachment is developed to the functionality of the building</p> <p>5.2 A conceptual model is prepared</p>
6. Prepare spatial brief	<p>6.1 Furniture requirements are established as per the spatial requirements and number of people</p> <p>6.2 Anthropometric and ergonomics studies are carried out based on furniture and users</p> <p>6.3 Spatial areas are computed as per the anthropometrics and ergonomics</p> <p>6.4 A spatial brief (accommodation schedule) is prepared as per computed areas.</p>
7. Produce schematic drawings	<p>7.1 Bubble diagram is prepared as per the spatial requirement</p> <p>7.2 A scaled sketch is formulated based on the bubble diagram and client's proposed budget.</p> <p>7.3 A sketch model is prepared as per the sketch</p> <p>7.4 An estimated cost is computed based on the sketch</p> <p>7.5 Drawing and estimated cost is presented to the client for approval or adjustments</p>
8. Prepare presentation drawings	<p>8.1 Sketches are adopted or adjusted based on the client's approval</p> <p>8.2 <b>Fittings</b> and <b>Furniture</b> layout and human elements incorporated in the drawing as per spatial requirement</p> <p>8.3 Major dimensions are indicated as per the spatial design</p> <p>8.4 Artistic impressions are incorporated in the drawing</p> <p>8.5 Drawing is presented to the client for approval or adjustments</p>
9. Prepare working drawings	<p>9.1 Presentation drawings are adopted or adjusted based on the client's approval</p> <p>9.2 Artistic impressions removed from the working drawings</p> <p>9.3 Drawing is fully dimensioned and labelled</p> <p>9.4 Door and window schedules are prepared as per working drawing</p> <p>9.5 Finishing materials and codes are indicated on the working drawing</p> <p>9.6 <b>Detailed site plan</b> is prepared observing local</p>

	<p>government regulations</p> <p>9.7 Drawing is plotted on a tracing paper</p> <p>9.8 Drawing is produced on blueprint</p> <p>9.9 Working drawing is submitted to the local government authorities for approval</p> <p>9.10 Bill of quantities is prepared as per the approved drawings</p> <p>9.11 Working drawing and bill of quantities presented to the client.</p> <p>9.12 A works program is prepared based on the size of the project</p>
10. Prepare details drawings	<p>10.1 <b>Engineering drawings</b> are integrated into the details drawings</p> <p>10.2 Required details are identified based on the working drawings</p> <p>10.3 Scaled details are produced</p> <p>10.4 Details drawings are presented to the contractor</p>
11. Revise working drawings	<p>11.1 <b>Design changes</b> are received from parties in the design team</p> <p>11.2 Additions and alterations are incorporated in the working drawings</p> <p>11.3 Revised working drawings presented to the contractor for implementation.</p> <p>11.4 As built drawings are presented to local authorities for issuance of Occupational Certificate</p>
12. Apply CADD in architectural work	<p>12.1 Sketch is drafted using design software</p> <p>12.2 Sketch is detailed to produce presentation drawing</p> <p>12.3 Presentation drawing is detailed to produce working drawing</p> <p>12.4 Detail drawing is produced using design software</p> <p>12.5 Detail drawing is plotted on a tracing paper</p> <p>12.6 Detail drawing is produced on blueprint</p> <p>12.7 Building Information Management Systems are applied as per workplace procedures</p>

### 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
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1. Design requirements may include but not limited to:	<ul style="list-style-type: none"> <li>• Function</li> <li>• Size</li> <li>• Colour</li> <li>• Orientation</li> </ul>
2. Fittings may include but not limited to:	<ul style="list-style-type: none"> <li>• Wash hand basins</li> <li>• Bathtubs</li> <li>• Water closet</li> <li>• Sinks</li> </ul>
3. Furniture may include but not limited to:	<ul style="list-style-type: none"> <li>• Chairs</li> <li>• Tables</li> <li>• Wardrobes</li> </ul>
4. Engineering drawings may include but not limited to:	<ul style="list-style-type: none"> <li>• Structural engineering drawings</li> <li>• Civil engineering drawings</li> <li>• Mechanical engineering drawings</li> <li>• Electrical engineering drawings</li> </ul>
5. Design changes may include but not limited to:	<ul style="list-style-type: none"> <li>• Alterations</li> <li>• Additions</li> </ul>
6. Detailed site plan may include but not limited to:	<ul style="list-style-type: none"> <li>• Building location</li> <li>• Sewer and storm water drainage</li> <li>• Plot coverage</li> </ul>

## 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:

- Designing
- Scheduling
- Sketching
- Drafting
- Modelling
- Creativity
- Estimation skills
- Observation skills
- Planning and organizing
- Analytical skills

### Required knowledge

The individual needs to demonstrate knowledge of:

- Design software
- History of architecture

- Design scales
- Anthropometrics and ergonomics
- Environmental regulations
- Architect's data
- Building standards and regulations
- Building codes
- Statutory regulations
- Safety precautions and regulations
- Fire standards
- Material science
- Mechanical services
- Electrical services
- Drainage systems
- Concept formulation
- Research
- Photography
- Structural design
- Thermal insulation
- Mathematics
- Acoustics
- Green concepts

### 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: <ul style="list-style-type: none"> <li>1.1 Prepared a design brief</li> <li>1.2 Prepared a site analysis report</li> <li>1.3 Prepared design concept</li> <li>1.4 Produced schematic drawings</li> <li>1.5 Prepared presentation drawings</li> <li>1.6 Prepared working drawings</li> <li>1.7 Prepared details drawings</li> <li>1.8 Applied CADD in architectural drawings</li> </ul>
2. Resource Implications	The following resources should be provided: <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>2.2 Materials relevant to the proposed activity or tasks</li> </ul>
3. Methods of Assessment	Competency in this unit may be assessed through: <ul style="list-style-type: none"> <li>3.1 Direct Observation</li> </ul>

	3.2 Oral Questioning 3.3 Portfolios 3.4 Projects 3.5 Written tests
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial Attachment
5. Guidance for information assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## PRODUCE ARCHITECTURAL PERSPECTIVES

**UNIT CODE:**CON/OS/ARC/CR/02/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to prepare freehand internal perspectives, prepare freehand external perspectives, produce pictorial views, apply CAD in preparing perspectives and produce walkthrough videos

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Prepare freehand internal perspectives	1.1 Internal <b><i>Perspective drawing</i></b> is designed 1.2 <b><i>Details</i></b> are incorporated in the perspective 1.3 Distance is indicated by aerial perspective.
2. Prepare freehand external perspectives	2.1 External perspective drawing is designed based on the number of vanishing points 2.2 Distance is indicated by aerial perspective
3. Produce pictorial views	3.1 The plan is drawn on a skewed or rotated 45-degree grid which keeps the original orthogonal geometry of the plan. 3.2 The verticals are projected vertically on the page 3.3 All lines are drawn to scale so that relationships between elements are accurate.
4. Produce walkthrough videos	4.1 Cameras are set as per the rooms or external space 4.2 Walkthroughs are generated 4.3 Sound is incorporated in the video
5. Apply CAD in preparing perspectives	5.1 Images/ Computer Generated <b><i>Renderings</i></b> are generated by a computer using three-dimensional modeling software or other computer software for presentation purposes 5.2 Lighting and materials are approximated using computer software. 5.3 Renderings are created for presentation, marketing and design analysis purposes. 5.4 Building design and its visual aspects are experimented.

## 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. Perspective drawing may include but not limited to:	<ul style="list-style-type: none"><li>• Two-point perspective</li><li>• Three-point perspective</li></ul>
2. Details may include but not limited to:	<ul style="list-style-type: none"><li>• Furniture and fittings</li><li>• Colour</li><li>• Finishes</li></ul>
3. Renderings may include but not limited to:	<ul style="list-style-type: none"><li>• Internal</li><li>• External</li></ul>

## 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:

- Design skills
- Planning and organizing
- Detailing
- Presentation skills
- Artistic skills
- ICT skills
- Creativity skills

### Required knowledge

The individual needs to demonstrate knowledge of:

- Art and design
- Perspectives
- Perspective software in CAD
- Walkthroughs
- Video development
- Digital media

## 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 Prepared internal perspectives 1.2 Prepared external perspectives 1.3 Produced walkthrough videos 1.4 Applied CAD in preparing perspectives
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Oral questioning 3.3 Portfolios
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.



## PRODUCE ARCHITECTURAL MODELS

**UNIT CODE:**CON/OS/ARC/CR/03/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to produce schematic, digital and physical architectural models

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Produce schematic/sketch models	1.1 A rough sketch is drawn based on the client's needs 1.2 A <b>design</b> is formulated based on the rough sketch and client's proposed budget. 1.3 A model is prepared as per the sketch
2. Produce physical model	2.1 Tools, materials and equipment are identified, gathered and used as per workplace procedures 2.2 The scaled plans are printed 2.3 <b>Physical model</b> is constructed as per the design 2.4 A <b>detailed model</b> is constructed as per the detailed design
3. Produce digital models	3.1 Presentation drawings are produced 3.2 Presentation drawings are rendered using CAD software

### 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.

<b>Variable</b>	<b>Range</b>
1. Design may include but not limited to:	<ul style="list-style-type: none"> <li>● Approximated floor plans</li> <li>● Simple elevations</li> <li>● Quick 3D views</li> <li>● Conceptual rough sections</li> </ul>
2. Physical model may include but not limited to:	<ul style="list-style-type: none"> <li>● site models</li> <li>● concept models</li> <li>● interior (demountable) models</li> </ul>

3. detailed model may include but not limited to:	<ul style="list-style-type: none"> <li>• stairs</li> <li>• door</li> <li>• window</li> <li>• roof</li> </ul>
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## 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:

- Modelling
- Design skills
- Creativity skills
- Interpretation of drawings
- Precision skills
- Measuring skills
- Artistic skills
- ICT skills

### Required knowledge

The individual needs to demonstrate knowledge of:

- Art and design
- Visualization
- Architectural modelling
- Architectural design
- Digital design software
- Measurements and scales

## 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: <ul style="list-style-type: none"> <li>1.1 Produced sketch model</li> <li>1.2 Produced physical models</li> <li>1.3 Produced digital models</li> </ul>
2. Resource Implications	The following resources should be provided: <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> </ul>

		2.2 Materials relevant to the proposed activity or tasks
3.Methods of Assessment		Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Oral questioning 3.3 Portfolios
4. Context of Assessment		Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial Attachment
5. Guidance information for assessment		Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## COST ARCHITECTURAL PROJECTS

**UNIT CODE:**CON/OS/ARC/CR/04/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to take off building components, abstract take off data, work up dimensions, prepare schedule of materials, prepare bill of quantities/ estimates, schedules and valuations and compute project costs.

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Take off building quantities	1.1 Building plans are acquired and interpreted as per workplace procedures. 1.2 Dimension sheet/paper is prepared based on the standard format 1.3 List of quantities to be measured is prepared based on SMM 1.4 <b>Quantities</b> are calculated based on the unit of measure 1.5 Dimensions are booked based on the principles of measurement 1.6 Booked items are described based on the standard method of measurement for building and associated civil works (SMM) and civil engineering standard method of measurements (CESMM)
2. Abstract take off data	2.1 Abstracting sheet is prepared based on the standard format 2.2 Description of booked items are transferred to the abstracting sheet as per SOPs 2.3 <b>Quantities</b> are transferred to the abstracting sheet 2.4 Net quantities are calculated as per SOPs 2.5 Running through dimensions is carried out as per SOPs
3. Work up dimensions	3.1 Timesing of dimensions is carried out as per SOPs 3.2 Quantities are determined as per SOPs
4. Prepare bill of quantities/ estimates	4.1 Billing paper is prepared based on the SMM. 4.2 Abstracted quantities and their corresponding descriptions are transferred as per SMM 4.3 Casting up is carried out as per SMM. 4.4 Bill of quantities is priced as per the SOPs.
5. Prepare schedule of materials	5.1 <b>Types of materials</b> and equipment to be used are identified and listed.

	5.2 Building materials are quantified and recorded on a standard schedule 5.3 Quoted rates are included in the material schedule
6. Prepare valuations of work done	6.1 Work done is valued 6.2 Payment certificates are prepared and issued to the client
7. Compute project costs	7.1 Unit rates are built up based on the work element 7.2 Unit rates are inserted as per SOPs 7.3 Total cost of each work element is calculated as per SOPs 7.4 Variation costs are determined 7.5 Change order is prepared and issued to the client

### **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.

<b>Variable</b>	<b>Range</b>
1. Quantities may include but not limited to:	<ul style="list-style-type: none"> <li>• Cubic</li> <li>• Square</li> <li>• Linear</li> <li>• Numbers (enumeration)</li> <li>• Items</li> </ul>
2. Types of materials may include but not limited to:	<ul style="list-style-type: none"> <li>• Fixtures</li> <li>• Timber</li> <li>• Walling materials</li> <li>• Roofing materials</li> <li>• Flooring materials</li> </ul>

### **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
- ICT skills
- Structural detailing
- Scaling
- Interpretation of drawings

## Required knowledge

The individual needs to demonstrate knowledge of:

- Costs and estimates
- Architectural and structural drawings
- Building technology
- Applied mathematics
- Structural design
- Standard documents (CESMM and SMM)
- Quantity surveying practice and procedures
- Construction procedures
- Units of measurement
- Principles and terminologies
- Abstracting
- Casting up
- Work study
- Bill of quantities

## 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 Carried out taking off of quantities 1.2 Worked up dimensions 1.3 Transferred descriptions of booked items to abstract sheet 1.4 Transferred quantities 1.5 Ran through dimensions 1.6 Billed measured works 1.7 Prepared bill of quantities 1.8 Valued work done 1.9 Built up unit rates
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Oral Questioning 3.3 Projects 3.4 Written tests
4. Context of	Competency may be assessed

Assessment	4.1 On job 4.2 Off job 4.3 During industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## LANDSCAPE ARCHITECTURAL PROJECTS

**UNIT CODE:**CON/OS/ARC/CR/05/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to prepare landscaping designs, prepare schedule of landscaping elements, and prepare ground for landscaping, set out landscape design and install landscape design.

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Prepare landscaping designs	1.1 Inventory and analysis of the biophysical environment is conducted. 1.2 Human community inventory and analysis is conducted. 1.3 Concepts are developed 1.4 Existing plan is adopted 1.5 Landscape is <b><i>designed</i></b> based on <b><i>objective qualities</i></b> and <b><i>subjective qualities</i></b> of the project.
2. Prepare schedule of landscaping elements	2.1 Types of equipment to be used are identified and listed. 2.2 Landscaping elements are numbered and recorded on a standard schedule. 2.3 Quoted rates are included in the landscaping element and equipment schedule
3. Prepare ground for landscaping	3.1 Area of the space is determined in accordance with the site layout design 3.2 The ground is cleared of any unwanted elements as per the design 3.3 The ground is levelled as per the design requirements
4. Set out landscape design	4.1 Landscape design layout is marked on the ground 4.2 Landscaping dimensions are transferred to the ground as per the design
5. Install landscape design	5.1 Ground cover is established 5.2 Drainage system is constructed 5.3 Fences and gates are constructed 5.4 External paving is laid 5.5 Irrigation method is determined as per landscape design 5.6 <b><i>Beautification</i></b> is carried out as per design specifications



## 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. Designed may include but not limited to:	<ul style="list-style-type: none"><li>• Creating the outline</li><li>• Creating ground cover if needed</li><li>• Adding new landscape design elements</li></ul>
2. Objective qualities include but not limited to:	<ul style="list-style-type: none"><li>• Climate and microclimates</li><li>• Topography and orientation</li><li>• Site drainage and groundwater recharge</li><li>• Municipal and resource building codes</li><li>• Soils and irrigation</li><li>• Human and vehicular access and circulation</li><li>• Furnishings and lighting</li><li>• Native plant habitat botany</li><li>• Property safety and security</li><li>• Recreational amenities (i.e.: sports and water)</li><li>• Construction detailing</li></ul>
3. Subjective qualities include but not limited to:	<ul style="list-style-type: none"><li>• Client's needs and preferences</li><li>• Desirable plants and elements to retain on site</li><li>• Artistic composition</li><li>• Spatial development and definition-using lines, sense of scale, and balance and symmetry</li><li>• Plant palettes</li><li>• Artistic focal points for enjoyment.</li></ul>
4. Beautification may include but not limited to:	<ul style="list-style-type: none"><li>• Ornamental trees</li><li>• Grass</li><li>• Flowers</li><li>• Fountains</li><li>• Water ways</li><li>• Shrubs</li></ul>

	<ul style="list-style-type: none"> <li>• Ground cover</li> <li>• Garden furniture</li> <li>• Garden lighting</li> </ul>
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## 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:

- Setting out
- Levelling
- Designing landscapes
- Gardening
- ICT skills
- Budgeting
- Creative skills
- Interpersonal skills

### Required knowledge

The individual needs to demonstrate knowledge of:

- Types of vegetation
- Soil types
- Survey
- Landscape designs
- Landscape design software
- Costing

## 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	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Designed landscape</li> <li>1.2 Prepared schedule of landscaping elements</li> <li>1.3 Prepared ground for landscaping</li> <li>1.4 Set out landscape design</li> <li>1.5 Landscaped the site</li> <li>1.6 Carried out beautification</li> </ul>
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> </ul>

	2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Oral Questioning 3.3 Portfolios 3.4 Projects
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During Industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## INSTALL BUILDING FINISHES AND FITTINGS

**UNIT CODE:** CON/OS/ARC/CR/06/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to apply wall finishes, install doors, windows and openings, fix floor finishes, apply paint, and install furniture, fittings and ceilings

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Apply wall finishes	1.1 <b>Wall finishes</b> are identified and designed as per the client's need. 1.2 Wall finishes are applied as per design
2. Install doors, windows and openings	2.1 Opening schedules and design are prepared 2.2 Marking of layout is carried out 2.3 Frame is fixed in the opening 2.4 Doors /windows are installed as per <b>material</b> and instructions 2.5 <b>Accessories</b> are installed on doors and windows
3. Fix floor and surface finishes	3.1 PPEs are identified, gathered and used as per SOPs 3.2 Floor finish is identified and designed as per clients need 3.3 Floor surface is <b>prepared</b> 3.4 <b>Floor finish</b> is applied as per specifications
4. Apply paint	4.1 Base surfaces are prepared prior to painting 4.2 Paint mix and varnish is prepared using various constituents as per specification and desired finish 4.3 Paint is applied to produce a paint film of uniform thickness as per requirements 4.4 Correction/remedial action of common painting defects is carried out. 4.5 Paint is left to dry.
5. Install furniture and fittings	5.1 <b>Furniture and fittings</b> are assembled 5.2 Furniture and fittings are <b>fixed</b> on the wall or floor based on the purpose.
6. Install ceilings	6.1 <b>Type of ceiling</b> is identified and designed as per clients need 6.2 Ceiling location is inspected for obstructions or problems that need to be fixed. 6.3 Levelling is conducted on the ceiling location 6.4 Ceiling is fixed as per the design

	6.5 Ceiling fixtures are placed.
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**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. Wall finishes may include but not limited to:	<ul style="list-style-type: none"> <li>• Paint</li> <li>• Tiles</li> <li>• Acoustics</li> <li>• Paddings</li> <li>• Cladding</li> </ul>
2. Accessories may include but not limited to:	<ul style="list-style-type: none"> <li>• Hinges</li> <li>• Knobs</li> <li>• Locks</li> <li>• Stay</li> </ul>
3. Floor finish may include but not limited to:	<ul style="list-style-type: none"> <li>• Tiles</li> <li>• Carpets</li> <li>• Terrazzo</li> <li>• Cement screed</li> </ul>
4. Type of ceiling may include but not limited to:	<ul style="list-style-type: none"> <li>• Gypsum</li> <li>• Acoustic</li> <li>• Timber</li> <li>• PVC</li> </ul>
5. Material may include but not limited to:	<ul style="list-style-type: none"> <li>• wooden</li> <li>• PVC</li> <li>• Metal</li> </ul>
6. Prepared may include but not limited to:	<ul style="list-style-type: none"> <li>• Patch</li> <li>• level any damaged or uneven areas</li> <li>• free of wax, soap scum, and grease.</li> <li>• Remove any moldings, trim, or appliances</li> <li>• Clean</li> <li>• holes or blemishes have been repaired and smoothed over</li> <li>• sandpaper</li> </ul>
7. Furniture and fittings include but not limited to:	<ul style="list-style-type: none"> <li>• Cabinets</li> <li>• Counter tops</li> </ul>
8. Fixed may include but not limited to:	<ul style="list-style-type: none"> <li>• Nailed</li> <li>• Glued</li> </ul>

## 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:

- Designing
- Planning and organizing
- Precision skills
- Measuring
- Assembling fittings
- Installing fittings and furniture
- Workmanship

### Required knowledge

The individual needs to demonstrate knowledge of:

- Construction methods
- Joinery and fittings
- Types of house finishes
- Fittings and furniture
- Paints
- Floor types.
- Wall types
- Doors, windows and opening types
- Installation of finishes

## 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 Installed wall finishes 1.2 Installed doors and windows 1.3 Installed floor finishes 1.4 Installed furniture and fittings 1.5 Applied paint 1.6 Installed ceilings
2. Resource Implications	The following resources should be provided: 4.1 Access to relevant workplace or appropriately simulated environment where assessment can take place

	4.2 Materials relevant to the proposed activity or tasks
3.Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation 3.2 Oral Questioning 3.3 Portfolios 3.4 Projects 3.5 Written tests
4. Context of Assessment	Competency may be assessed 4.1 On Job 4.2 Off job 4.3 During Industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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## APPLY ALTERNATIVE BUILDING TECHNOLOGY

**UNIT CODE:**CON/OS/ARC/CR/07/6/A

### UNIT DESCRIPTION

This unit describes the competencies required to construct using EPS (expanded polystyrene systems), interlocking blocks, concrete prefabricated wall panels, metal panels, timber panels, plastics and glass panels and traditional construction materials.

<b>ELEMENTS</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Construct using EPS (expanded polystyrene systems)	1.1 EPS material is gathered 1.2 EPS is placed and short created to form wall parts 1.3 Wall parts are joined together to build the house based on the building design
2. Construct using interlocking blocks	2.1 Interlocking blocks are dry stacked on top of each other as per the design 2.2 Minimal mortar/slurry is applied between the interlocking blocks
3. Construct using concrete prefabricated wall panels	3.1 Precast concrete is <i>cast</i> 3.2 Precast is lifted to its final resting place 3.3 Precast is <i>fixed securely</i> to the next one as per the design
4. Construct using metal panels	4.1 Metal panels are insulated 4.2 Metal panels are joined together to form continuous walls as per the design
5. Construct using timber panels	5.1 Timber panels are joined to form walls as per the design 5.2 Timber panels' surfaces are polished and treated 5.3 Panels are <i>coated</i>
6. Construct using glass panels	6.1 Glass panels are bolted together to form walls as per the design 6.2 Glass panels are cleaned and polished
7. Construct using plastic panels	7.1 Plastic panels are securely joined together to form walls as per the design 7.2 Plastic panels are cleaned



8. Construct using traditional construction materials	8.1 <i>Traditional construction materials</i> are identified and costed 8.2 Traditional materials are applied in construction and finished 8.3 Traditional construction materials are maintained as per the type
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### 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. Cast may include but not limited to:	<ul style="list-style-type: none"> <li>• At the building site</li> <li>• In a factory</li> </ul>
2. fixed securely may include but not limited to:	<ul style="list-style-type: none"> <li>• Bolted together.</li> <li>• Grouted or concreted together.</li> </ul>
3. Coated may include but not limited to:	<ul style="list-style-type: none"> <li>• Painted</li> <li>• Varnished</li> </ul>
4. Traditional construction materials may include but not limited to:	<ul style="list-style-type: none"> <li>• Grass</li> <li>• Makuti</li> <li>• Mud blocks</li> <li>• Bamboo</li> <li>• Mazeras</li> <li>• Mud and wattle</li> <li>• Hides and skins</li> <li>• Strings</li> <li>• Coral stones</li> </ul>

### 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:

- Planning and organizing
- Building
- Joining
- Insulating walls
- Welding

- Varnishing
- Polishing
- Painting
- Fixing

### Required knowledge

The individual needs to demonstrate knowledge of:

- PPEs
- Building materials
- Building techniques
- Safety precautions
- Modern building techniques

### EVIDENCE GUIDE

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

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <p>1.1 Constructed using EPS (expanded polystyrene systems)</p> <p>1.2 Constructed using interlocking blocks</p> <p>1.3 Constructed using concrete prefabricated walls</p> <p>1.4 Constructed using steel panels</p> <p>1.5 Constructed using timber panels</p> <p>1.6 Constructed using glass panels.</p> <p>1.7 Constructed using plastics</p> <p>1.8 Constructed using traditional construction materials</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</p> <p>2.2 Materials relevant to the proposed activity or tasks</p>
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Direct Observation</p> <p>3.2 Oral Questioning</p> <p>3.3 Portfolios</p> <p>3.4 Projects</p>
4. Context of Assessment	<p>Competency may be assessed</p> <p>4.1 On job</p> <p>4.2 Off job</p> <p>4.3 During industrial Attachment</p>
5. Guidance information for	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>

assessment	
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## MANAGE CONSTRUCTION SITE

**UNIT CODE:** CON/OS/ARC/CR/08/6/A

### UNIT DESCRIPTION

This Unit describes the competences required to manage project statutory approval, manage projects human resource, interpret building contract documents, organize construction site, review construction work plan, manage project expenditures, monitor site activities, coordinate quality standards and keep site records

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Manage project statutory approval process	1.1 <b>Regulatory authorities</b> are identified 1.2 Development process is identified as per regulatory authority
2. Manage projects human resource	2.1 Occupational health, safety and welfare is observed as per workplace procedures 2.2 Projects roles and responsibilities are identified. 2.3 Attendance register is prepared and updated daily 2.4 Project team is developed as per organisational standards.
3. Interpret building contract documents	3.1 Building contract documents are reviewed. 3.2 Building contracts are interpreted as per the contract type. 3.3 Contract information is recorded as per the contract interpretation.
4. Organize construction site	4.1 Construction site map is evaluated. 4.2 Site arrangement is checked and re-planned if need arises. 4.3 Construction site spaces are allocated as per <b>construction site zoning</b> . 4.4 <b>Site infrastructure</b> and traffic routes are identified as per the site map. 4.5 Site plant and equipment are positioned according to the site map. 4.6 <b>Site installations</b> are placed according to the site map.
5. Review construction work plan	5.1 Projects time schedule is prepared as per the scope of work. 5.2 Projects scope of work is evaluated as per the project documents.

ELEMENT	PERFORMANCE CRITERIA ( <i>Bold and italicized terms are elaborated in the Range</i> )
	5.3 Projects work equipment is allocated as per the time schedule.
6. Manage project expenditures	6.1 Information is balanced and agreed upon. 6.2 Project scope of work is determined as per working drawings. 6.3 Project work is divided into items and sub items. 6.4 Project items are described as per mode of performance. 6.5 Rates are inserted against the items as per building standard costing rates and site location. 6.6 Items rates are totaled to acquire the project total cost.
7. Conduct material management	7.1 Quantity of materials needed is projected as per work to be done 7.2 Materials are stored and secured as workplace procedures 7.3 Materials are re-ordered in time 7.4 Materials are portioned precisely as per design requirements
8. Monitor site activities	8.1 Construction requirements and approvals are identified as per <i>statutory requirements</i> . 8.2 Construction activities progress is noted against performance standards. 8.3 Project status/task performance is analysed against building plans and specifications. 8.4 Efficiency and effectiveness of site activities are analysed. 8.5 <i>Method statement</i> for works is prepared 8.6 Site meetings and inspections are conducted 8.7 Project report and results are analysed.
9. Coordinate quality standards	9.1 Quality standard manuals are reviewed. 9.2 <i>Proper construction methods</i> are observed 9.3 Samples of materials are taken, and quality tests performed. 9.4 Site work progress is observed regularly and errors corrected. 9.5 Qualified staffing is ensured as per their performance. 9.6 Right quality equipment and tools are ensured.
10. Keep site records	10.1 <b>Record parameters</b> are identified based on project requirements

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>(Bold and italicized terms are elaborated in the Range)</i>
	10.2 Data entry methods are identified and applied 10.3 Regular updates of records are maintained according to the job requirement

### **RANGE**

<b>Variable</b>	<b>Range</b>
1. Regulatory authorities include but not limited to:	<ul style="list-style-type: none"> <li>• County government</li> <li>• NEMA</li> <li>• NCA</li> <li>• OSHA</li> </ul>
2. Construction site zoning may include but not limited to:	<ul style="list-style-type: none"> <li>• Central zone</li> <li>• Internal</li> <li>• Intermediate</li> <li>• External.</li> </ul>
3. Site infrastructure may include but not limited to:	<ul style="list-style-type: none"> <li>• Roads</li> <li>• Walk ways</li> </ul>
4. Site Installation may include but not limited to:	<ul style="list-style-type: none"> <li>• First aid points</li> <li>• Protection equipment</li> <li>• Temporary works</li> <li>• Fire stations</li> </ul>
5. Statutory requirements include but not limited to:	<ul style="list-style-type: none"> <li>• Building codes</li> <li>• Public health Act</li> <li>• Local government authorities</li> <li>• NEMA</li> <li>• NCA</li> </ul>
6. Method statement may include but not limited to:	<ul style="list-style-type: none"> <li>• Health and safety</li> <li>• Cooperation of workers</li> <li>• Coordination of work</li> </ul>
7. Proper construction methods include but not limited to:	<ul style="list-style-type: none"> <li>• Curing</li> <li>• Treating timber</li> <li>• Treating steel</li> </ul>
8. Record parameters may include but not limited to:	<ul style="list-style-type: none"> <li>• Site attendance book</li> <li>• Inspection book</li> <li>• Visitor's book</li> <li>• Order book</li> </ul>

## REQUIRED KNOWLEDGE

- Contracts
- Human resource management
- Costing
- Construction methods
- Site records
- Legal construction certifications and approvals
- Construction authorities
- Tools, equipment and materials
- Safety precautions

## SKILLS

- ICT skills
- Communication skills
- Planning and organizing
- Monitoring and evaluation
- Management Skill
- Interpersonal skills
- Budgeting
- 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: 1.1 Organised construction site. 1.2 Interpreted contract documents. 1.3 Reviewed project work plan. 1.4 Managed human resource. 1.5 Managed project expenditures 1.6 Managed construction materials 1.7 Prepared site records. 1.8 Monitored site activities. 1.9 Coordinated quality standards.
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Portfolios

	3.4 Projects
4. Context of Assessment	Competency may be assessed 4.1 On the Job 4.2 Off the Job 4.3 During Industrial Attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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